Hazardous Waste Management Program

GOVERNMENTS WORKING TOGETHER FOR A HEALTHIER AND CLEANER KING COUNTY

2024

Service Equity Analysis

Hazardous Waste Management Program
GOVERNMENTS WORKING TOGETHER FOR A HEALTHIER AND CLEANER KING COUNTY

Since its inception in 1989, the Hazardous Waste Management Program in King County (Haz Waste Program) has become a regional coalition of government agencies all working together on a common goal: to make the Puget Sound region the cleanest in the country. The Haz Waste Program serves over 2 million people, two tribal nations, and 70,000 businesses in King County.

The participating agencies include the King County Department of Natural Resources and Parks, Public Health – Seattle & King County, Seattle Public Utilities, and Sound Cities Association. Together, these agencies work to protect and improve public health and environmental quality in the region by leveraging their resources, effecting system change, and addressing disproportionality in the services and community outcomes.

The services provided include regional education, outreach, research and evaluation, community support, information resources, collections services, and assistance for businesses in managing hazardous waste.

201 South Jackson Street, Suite 5600
Seattle, WA 98104
(206) 296-4692
haz.waste@kingcounty.gov
kingcounty.gov/hazwaste

Alternate Formats Available
Voice: (206) 263-3672 or TTY Relay: 711

Authors: Trevor Peckham, PhD, MS, MPA; Roger J. Chin, PhD; and Myles Perkins, PE

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Executive Summary

The Service Equity Analysis conducted by the Hazardous Waste Management Program in King County (Haz Waste Program) aims to evaluate and enhance the alignment of service delivery with the evolving demographics of the community. The population of King County is becoming increasingly diverse; however, systemic barriers stemming from historical disparities persist, which complicates efforts for many community members and limits equitable access to hazardous waste disposal services. Recognizing the significant disparities in exposure to hazardous waste, especially among marginalized and underserved communities, the Haz Waste Program seeks to ensure equitable access to its services and resources.

This analysis is guided by three primary questions regarding the demographics of service users, the effectiveness of service implementation in ensuring equitable access, and the geographic distribution of services. By examining these topics, the report highlights existing disparities, recommends strategies for improving service delivery, and provides a foundation for ongoing evaluation of equitable access.

The Service Equity Analysis uses three methodological approaches that corresponds to different types of data: individual-level data, geospatial data, and ZIP code-level data. Individual-level data provides insights into the demographics of customers accessing Haz Waste Program services, which emphasizes opportunities for improvement in service delivery. Geospatial data, aligned with the Environmental Health Disparities (EHD) mapping tool, reveals whether services are reaching priority populations burdened by environmental and socioeconomic risks. ZIP code-level data aggregates demographic information to evaluate service usage patterns across different communities. While this data operates at a broader level, it offers substantial insights into disparities in access and service use among King County residents and businesses.

Collections Services

The assessment conducts a thorough review of collection event locations and the demographics of customers using various collection services, including those at fixed facilities, Wastemobile services, and city and tribal events. The findings identify disparities in access to these services, particularly among marginalized communities, low-income households, and those with limited English proficiency.

The data indicates that customers who identify as White are overrepresented at collection facilities and Wastemobile events, while BIPOC customers are underrepresented compared to their overall representation in King County. Additionally, an exploration of ZIP code-level data reveals an inverse relationship between service usage rates and the percentage of customers who are BIPOC, low-income, or non-English speaking. Specifically, as the proportion of customers who identify as BIPOC, low-income, or speak a non-English language at home increases within a ZIP code, the rate of usage of collection services tends to decline. Geographic analysis further illustrates that only a small fraction of collection events is held in highly impacted communities, suggesting that service delivery is not adequately prioritized for those encountering the greatest environmental and socioeconomic challenges. There is a need for strategic outreach and enhanced service accessibility to ensure that all residents and businesses can equitably benefit from hazardous waste collection services.

Business Services Program

This analysis assesses the geographic distribution and site contacts demographic characteristics of small quantity generators (SQGs) receiving technical assistance visits from Business Services Program (BSP) field representatives. By mapping the addresses of SQGs and overlaying this data with the EHD mapping tool, the assessment indicates that technical assistance visits predominantly occur in the most highly impacted areas of King County, demonstrating that BSP prioritizes services toward SQGs located in communities encountering significant environmental and social burdens. Furthermore, the majority of site contacts interacting with BSP field representatives belong to BIPOC communities and show that BSP is reaching SQGs owned or operated by individuals from these groups.

Residential Services Program

The assessment examines the reach and demographics of community engagement events and home lead investigations from the Residential Services Program (RSP). The analysis focuses on understanding the racial and ethnic composition of community members, their preferred languages at home, and the geographic distribution of services offered. The outcomes from the community engagement and education events indicate that a significant portion of community members attending these events identifies as BIPOC. Moreover, the outreach efforts were predominantly in areas most affected by environmental health disparities, with 74.2% of events conducted in highly impacted communities. Overall, the results suggest a strong alignment between engagement efforts with communities encountering the greatest environmental and socioeconomic challenges.

This analysis also explores the racial and ethnic composition of the home lead investigation cases, focusing on confirmed cases, the countries of origin of the children involved, their age groups, and whether they have newly arrived in the United States. The majority of children in these cases identify as Middle Eastern or North African, primarily from Afghanistan, with a significant representation from newly arrived families. Approximately 75% of the lead cases are confirmed, highlighting the effectiveness of RSP in addressing lead exposure. Notably, all families identifying as Black or African American have recently resettled in Washington State and are not US native-born. Most of the children involved are 0-6 years old (78.9%), and newly arrived children make up 51.9% of the cases.

Haz Waste Program Haz Line

The Haz Waste Program Haz Line is a call center managed by the Communications team that connects individuals with experts who provide guidance on product disposal, safer alternatives, and natural yard care. The collected data specifically focuses on calls related to hazardous waste services and excludes those associated with natural yard care, since data was not ascertained for those calls. An analysis of 203 callers from August to October 2024 reveals that the majority identify as White, which is higher than the overall percentage of White residents in King County, while BIPOC callers are underrepresented. The largest portion of callers is in the "66 or older" age range, representing 38.4% of the total calls. This is followed by the "55-65" age range, which accounts for 27.1% of the callers. Over 60% of the callers identify as male, and the primary reason for contacting the Haz Line is inquiries related to hazardous waste disposal.

Conclusion

By leveraging multiple data sources and analytical approaches, the Haz Waste Program endeavors to identify service delivery inequities and develop strategies that ensure all residents and businesses, regardless of their demographic background, have equitable access to services and resources. An assessment of the Service Equity Analysis is needed to achieve the long-term goals of protecting community and environmental health in King County. The findings highlight significant disparities in service access, particularly affecting BIPOC communities, low-income residents, and non-English-speaking households who often live in areas most impacted by environmental health issues.

The data indicate that users of services such as collection, disposal, and the Haz Line call center–in which residents and businesses have to seek out services–are more likely to be White, affluent, and English-speaking compared with the overall demographics of King County. Conversely, direct service delivery by the Haz Waste Program—through community engagement events, educational workshops, and technical assistance visits—reflects a more equitable distribution of services with increased engagement from BIPOC, low-income, and non-English-speaking residents.

The Service Equity Analysis reveals notable disparities in specific service areas. This analysis not only identifies opportunities for improvement but also offers strategies informed by prior community-centric research conducted by the Haz Waste Program. These earlier studies uncovered common themes and requests from community members regarding how to enhance services and outreach. The findings of this analysis confirm and align with the opportunities for improvement expressed by community members.

The Service Equity Analysis provides a comprehensive set of opportunities for improvement with the objective of enhancing services offered by the Haz Waste Program.

- **Standardized Data Collection:** Data collection should adhere to standardized protocols to ensure the reliability and validity of the data. This includes implementing consistent terminology for demographic categories, using online data collection software, and conducting data collection within a similar timeframe to enhance the consistency and comparability of the data.

- **Methods to Evaluate Service Equity:** Evaluations should integrate qualitative and culturally appropriate methodologies to complement quantitative data analysis. This mixed-methods approach will provide a more nuanced understanding of service equity outcomes and how different communities are impacted. Surveys that assess user satisfaction and identify barriers can yield valuable insights for improving service delivery.

- **Focus on Highly Impacted Communities:** Prioritizing service delivery in highly impacted communities is crucial for addressing systemic inequities and ensuring access to necessary resources for underserved communities. Even though focusing on these communities is currently a goal of the Haz Waste Program, the Service Equity Analysis has revealed significant opportunities for improvement in how communities are prioritized. To effectively address these disparities and increase equitable access to services, the Haz Waste Program should leverage

available data resources and tools that are not currently used by all teams. This will enable more informed decision-making and outreach.

- **Maintain and Build Partnerships with CBOs**: Establishing meaningful and equitable partnerships with community-based organizations that serve priority populations is essential for maximizing the effectiveness of the Haz Waste Program. These organizations offer valuable insights into community needs and challenges, which allows for the development of customized engagement strategies that foster trust and a sense of community ownership.

  Rather than simply increasing the number of CBOs collaborating with the Haz Waste Program through single engagement initiatives, the focus should be on enhancing the quality and sustainability of these partnerships. This approach aligns with the principles of community-based participatory research (CBPR), which emphasizes long-term relationships built on trust and mutual learning. Investing resources and time in these relationships is essential because meaningful collaboration is a gradual process that requires a significant commitment. By deepening connections with trusted CBOs, the Haz Waste Program can raise awareness of available resources, improve communication channels, and better address the needs of these communities.

- **Invest More in Wastemobile Services:** Increasing investment in Wastemobile services can reduce barriers to hazardous waste disposal. By strategically deploying mobile collection services in locations such as parks, multifamily properties, and community centers, these efforts can effectively reach geographically isolated communities and individuals.

- **Explore Implementing Curbside Services:** The Haz Waste Program should explore the feasibility of curbside pickup services for hazardous waste disposal to increase convenience for residents. Many community members encounter challenges in traveling to collection facilities due to transportation limitations and time constraints, and curbside services would significantly reduce these barriers, increase participation rates, and improve equitable access for residents.

- **In-Language, In-Culture, and Disability Data:** Collecting data on language access, cultural services, and disability can further identify barriers and improve service delivery. Prioritizing these data collection areas will increase participation and foster greater community engagement and inclusivity.

- **In-Language, In-Culture, and Disability Awareness Training for Staff Members:** Implementing standardized training for staff on language access, cultural sensitivity, and disability awareness is essential for effective community engagement. These training sessions will prepare staff members with the necessary skills to address the unique needs of diverse populations. By enhancing staff capabilities, the Haz Waste Program can improve community interactions and ensure a welcoming environment for all.

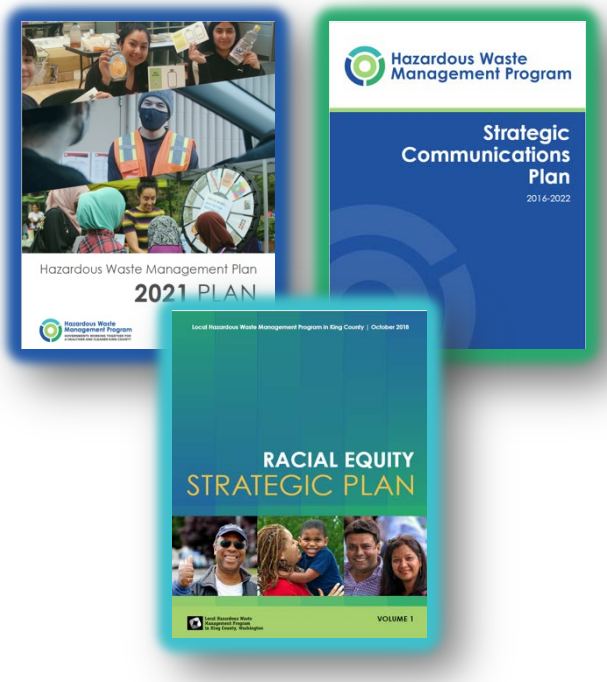
Acknowledgment

This report would not have been possible without the dedication of the Haz Waste Program staff members who worked tirelessly to collect data, share data, review early drafts, and offer valuable insights that significantly enriched the quality of the report. This project was a rewarding experience for the authors because it illustrated the exceptional efforts accomplished by the various Lines of Business.

The unwavering commitment toward equity and social justice was inspiring and reflected a collective determination to make a meaningful impact in King County. This collaborative effort reaffirms the commitment of the Haz Waste Program to foster an inclusive environment for all, to strive for positive change, and to protect and improve public and environmental health in King County.

Overview

Service Equity Analysis



The Research Services team with the Hazardous Waste Management Program in King County (Haz Waste Program) has been tasked with evaluating how service delivery aligns with the evolving demographics of the community. By leveraging data from various sources, the Haz Waste Program aims to ensure that its efforts reflect and serve the diverse needs of all community members.

The Haz Waste Program recognizes that demographic characteristics such as race and ethnicity can significantly influence an individual's exposure to hazardous waste, as well as their vulnerability to such exposures, and this can lead to harmful disparities that impact the health and well-being of the most marginalized populations. The Service Equity Analysis is designed to support long-term strategic goals by aligning services with a Results-Based Accountability (RBA) framework centered on racial equity. The RBA framework assesses both population-level and service-level outcomes to identify areas for improvement, which fosters a deeper understanding of root causes and systemic factors that contribute to service gaps. By clarifying existing disparities in service delivery, this report aims to guide the implementation of a racial equity-centered RBA framework within the Haz Waste Program to ultimately enhance community health and access to services.

Introduction

The Haz Waste Program is committed to ensuring that all residents and workers in the county have equitable access to its services and that race is not a determinant of exposure to hazardous materials.[1] A core principle in achieving this vision is to embed equity into service delivery and implementation across all operations.

The population of King County is growing rapidly and becoming increasingly diverse in its racial, ethnic, and cultural composition. However, this growth has also been accompanied by widening income disparities and a deepening affordability crisis, which disproportionately affect people of color. Data reveal that Black, Indigenous, and People of Color (BIPOC) communities in the region experience worse outcomes than their White counterparts across critical areas such as health, housing, education, employment, and criminal justice.[2]

The evaluation of service delivery through an equity lens is essential because residents and businesses encounter differing circumstances and challenges when accessing government services. Systemic inequities—rooted in historical, social, and economic disparities—create barriers for marginalized groups, including BIPOC individuals, low-income households, and community members with limited English proficiency. These barriers often manifest as limited awareness of available services, linguistic and cultural mismatches, transportation difficulties, and a lack of access to digital resources.[3]

These challenges extend to the management of hazardous waste services. Communities with lower incomes or a higher percentage of BIPOC residents are more likely to encounter environmental injustices, including greater exposure to toxic substances and fewer resources to address these risks. Moreover, logistical obstacles, such as limited transportation options or inaccessible communication channels, can prevent these communities from fully benefiting from Haz Waste Program resources, particularly disposal services.

To ensure that services are accessible and inclusive for all community members, the Haz Waste Program must first identify the existing disparities in service delivery. This Service Equity Analysis aims to answer three questions:

- What are the racial and ethnic demographics of customers accessing Haz Waste Program services?
- How effectively are services being implemented to ensure equitable access across diverse communities?
- How equitable is the geographic distribution of services in King County, particularly in areas identified as highly impacted?[4]

This report primarily focuses on identifying disparities within the Haz Waste Program to better understand how equitably services are reaching diverse communities across King County. By analyzing existing data, the goal of the report is to highlight opportunities for improvement in resource delivery and suggest ways to strengthen data collection and analysis strategies that can support ongoing evaluation of service equity. Furthermore, these insights are intended to guide future efforts in designing more inclusive and accessible initiatives.

A Snapshot of Racial Equity in King County

To better understand and address the existing racial inequities in King County, this section presents key community indicators that highlight residential demographics and environmental justice issues. These indicators include metrics on poverty, languages spoken at home, and the distribution of residents living in areas significantly impacted by environmental and social risk factors. By contextualizing these disparities, this overview provides the foundation for identifying inequities and supporting the need for a racial equity-based approach in service planning and implementation.

Racial Inequities and Diversity in Poverty and Languages Spoken in King County

Table 1 presents the current population of King County, including the prevalence of non-English speakers and residents living at or near poverty categorized by race and ethnicity. This data is derived from the 2017-2021 American Community Survey (ACS) 5-Year Public Use Microdata Sample (PUMS) from the US Census Bureau.

Table 1. King County Population and Prevalence of Low-Income Status and Non-English Language Spoken at Home by Race and Ethnicity (2021 5-year ACS PUMS Data)

Race and Ethnicity	Total	% Total	% Below 200% of Federal Poverty Line	% Non-English Language Spoken at Home	Poverty Ratio	Non-English Ratio
American Indian or Alaska Native	9,000	0.4	44.2	12.7	3.09	1.33
Asian or Asian American	418,000	18.6	17.1	73.6	1.19	7.73
Black or African American	142,000	6.3	40.9	37.3	2.86	3.92
Hispanic or Latino/a/x	224,000	10	34.5	65.2	2.41	6.84
Native Hawaiian or Pacific Islander	16,000	0.7	24.5	47.6	1.71	5
Some Other Race	10,000	0.4	24.9	27.6	1.74	2.9
Two or More Races	142,000	6.3	21.6	14.6	1.51	1.54
White	1,280,000	57.1	14.3	9.5	1	1
Total	2,241,000	100	19.2	29.3	1.34	3.07

Notes: Total population estimates are rounded to the nearest 1,000 to account for the lack of precision within this data source. The ratio measure is calculated as the indicator value for each race and ethnicity group divided by the White value. Ratios over 1 indicate that a given race and ethnicity group has a higher rate (e.g., a ratio of 2.0 means that a group is two times, or twice, as likely as the White population). Being below 200% of the Federal Poverty Line is a widely used metric to identify "low income" populations who may encounter greater economic challenges but are not necessarily below the official poverty line.

Interpretations

- Residents in King County who identify as BIPOC are significantly more likely to live at or near poverty or to speak a language other than English at home, both which present potential barriers to accessing Haz Waste Program services, including Household Hazardous Waste (HHW) collections.
- American Indian or Alaska Native, Black or African American, and Hispanic or Latino/a/x residents are more than twice as likely to be low-income compared to White residents.
- Residents identifying as Asian, Hispanic or Latino/a/x, and Native Hawaiian or Pacific Islander are five times more likely to speak a language other than English at home compared to White residents.

Racial Inequities in Communities Highly Impacted by Environmental Health Disparities

Table 2 presents an analysis of the racial and ethnic distribution of residents in areas highly impacted by environmental and social risk factors in King County. This analysis is based on two data sources:

- Race and ethnicity of residents by census tract from the ACS (2017-2021, 5-year data).
- An indicator of census tracts classified as "highly impacted" by the Environmental Health Disparities (EHD) mapping tool administered by the Washington State Department of Health (WA DOH). The EHD map includes 19 indicators designed to capture the cumulative impact of environmental and social risk factors within specific communities or neighborhoods, allowing for comparisons to identify which communities are disproportionately impacted.

Table 2. Racial and Ethnic Distribution of Residents in King County Census Tracts Highly Impacted by Environmental Health Disparities (5-Year ACS Data by Census Tract and WA DOH EHD V2, 2021)

Race and Ethnicity	Highly Impacted	% Highly Impacted	Not Impacted	% Not Impacted	Total	% Total	Ratio % Highly Impacted
American Indian or Alaska Native	2,000	25.2	7,000	74.8	10,000	0.4	1.73
Asian or Asian American	100,000	23.8	319,000	76.2	418,000	18.7	1.64
Black or African American	70,000	49.7	71,000	50.3	142,000	6.3	3.42
Hispanic or Latino/a/x	80,000	35.8	144,000	64.2	224,000	10	2.46
Native Hawaiian or Pacific Islander	8,000	51.7	8,000	48.3	16,000	0.7	3.56
Some other race	2,000	17.8	8,000	82.2	10,000	0.5	1.22
Two or more races	33,000	23.3	109,000	76.7	142,000	6.3	1.6
White	186,000	14.5	1,093,000	85.5	1,279,000	57.1	1
Total	481,000	21.5	1,759,000	78.5	2,241,000	100	1.48

Notes: Total population estimates are rounded to the nearest 1,000 to account for a lack of precision. The ratio measure is calculated as the proportion of residents living in highly impacted census tracts for each race and ethnicity group, divided by the proportion among the White population. Ratios above 1 indicate that a given race and ethnicity group has a higher rate (e.g., a ratio of 2.0 means that a group is two times, or twice, as likely as the White population).

Interpretations

- Residents identifying as BIPOC are significantly more likely to live in areas that are highly impacted by both environmental and social risk factors.
- In particular, Black or African American, Hispanic or Latino/a/x, and Native Hawaiian or Pacific Islander residents are more than twice as likely to reside in highly impacted census tracts compared to White residents.

Data and Methodologies

The Haz Waste Program is working to standardize the collection of demographic information and other data from customers and community members. This report aims to leverage existing data to examine equity in service implementation. This section outlines the data sources and analytical approaches used to assess the reach and distribution of Haz Waste Program services. Data sources for the Service Equity Analysis include individual-level information (e.g., demographics of customers and community members), geospatial data (e.g., locations of community engagement and education events), and customer ZIP code information. Table 3 summarizes the data sources used in this analysis, organized by the Lines of Business (LOBs) within the Haz Waste Program. Each entry details the service or activity, data type, collection period, sample size, and methods used for gathering this information.

Overview of Analytical Approaches

The analyses are organized by LOBs and adapted to the data type, collection methods, services provided, and other relevant factors. Three primary methodological approaches are used to evaluate service delivery equity across King County.

Individual-Level Data

This type of data answers the question, "Who is the Haz Waste Program serving?" The sources of data include surveys conducted at service delivery locations (e.g., collection facilities, Wastemobile events, and community engagement events) and information gathered by field representatives (e.g., demographics of site contacts at small quantity generators [SQGs] or children involved in lead investigations). Analyzing this data entails summarizing customer demographics and comparing them to overall King County statistics to determine representation and identify potential service improvements among underserved communities.

Geospatial Data

This type of data helps answer the question, "Where are Haz Waste Program services being delivered?" These data sources consisted of address information documenting where services were delivered across King County, including locations of events (e.g., Wastemobile collections events, city and tribal collections events, or community engagement events) and other services delivered in the field (e.g., technical assistance to SQGs). Analyzing this data involves geocoding addresses and relating these locations to information from the EHD mapping tool, which combines 19 indicators related to pollution burden and population characteristics associated with environmental risk. This analysis identifies whether services are delivered to priority populations and reveals potential improvements in areas with high environmental and social burdens.

ZIP Code-Level Data

This data focuses on ZIP codes provided by HHW collection customers and assesses the relationship between service usage rates and demographic variables at the ZIP code level (e.g., racial composition, income, and language spoken). Although this data is not at the individual level—ZIP codes are used as a proxy for customer demographics based on the demographic composition of their residences—the large sample size (approximately 60,000 data points in 2023) provides valuable insights into service usage patterns and gaps in service delivery among overburdened communities.

Further details on data sources and analysis methodologies are provided below. The reporting for each assessment follows this format:

- Purpose
- Approach
- Data Source(s)
- Findings
- Limitations

Table 3. Service Equity Analysis Datasets

Lines of Business	Service	Data Type	Data Collection Range	Sample Size	Data Description
Collections	Auburn Collection Facility	Individual-Level Data (Survey)	Q2-Q3 2024	353 Customers	Surveys were conducted by Resource Recycling Systems (RRS), a contracted service provider.
	South Seattle Collection Facility			353 Customers	
	North Seattle Collection Facility		Q1-Q3 2023	7,604 Customers	Surveys were conducted by Haz Waste Program staff members as part of a pilot project for a demographic study.
	Factoria Collection Facility		Q4 2024	26 Customers	Data Not Used: Data collected by Haz Waste Program staff as part of a pilot project did not yield enough surveys for analysis. Review the limitations section for more information.
	Wastemobile		Q1-Q4 2024	738 Customers	Surveys were conducted by PRR, a contracted service provider, during four multi-day events held in the cities of Covington, Des Moines, Kent, Kirkland, and Renton.
	HHW Collections (all facilities and Wastemobile)	Customer ZIP Codes	Q1-Q4 2023	59,418 Customers	ZIP codes reported by HHW collections customers were obtained from the Moderate Risk Waste (MRW) database and are linked to ZIP code-level population demographics.
	Wastemobile Events	Geospatial	Q1-Q4 2024	20 Events	Locations of Wastemobile HHW collection events.
	City and Tribal Collection Events		Q1-Q3 2024	50 Events	Locations of HHW collection events and ongoing battery collection sites.
Business Services Program	Technical Assistance Visit-Locations		Q1-Q4 2024	268 Visits	Address information for small quantity generators receiving technical assistance.
	Technical Assistance Visit-Site Contacts	Individual-Level Data (Field Report)	Q1-Q4 2024	234 Contacts	Demographic information was collected by Haz Waste Program staff members during technical assistance visits to small businesses.
Residential Services Program	Community Engagement and Education Events	Geospatial	Q1-Q4 2024	66 Events	Event locations, total participants, and group-level race and ethnicity data. Individual responses were not collected. A total of 663 individuals participated in these events.
	Lead Investigations	Individual-Level Data (Field Report)	Q1-Q3 2024	227 Cases	Demographic information was collected by Haz Waste Program staff members during home visits and through questionnaires administered over the telephone.
Communications	Haz Line	Individual-Level Data (Survey)	Q3 2024	203 Callers	Demographic information was collected over the phone by Tilth Alliance, the operator of the Haz Waste Program Customer Haz Line.

Collections Services: Facility HHW Customer Demographics from Survey

Purpose

Understand the reach and demographics of customers using permanent collection facilities.

Approach

The analysis examined the racial and ethnic composition of HHW customers based on survey data and comparing it with demographic data from the US Census Bureau. Surveys were conducted at three facilities (Auburn, North Seattle, and South Seattle), which provided insights into the race and ethnicity of customers using HHW collection services at these locations. This data was then compared to population statistics on race and ethnicity for residents within a five-mile radius of the collection facilities, gathered using the US Environmental Protection Agency's (EPA) Environmental Justice Screening and Mapping Tool (EJScreen).

By contrasting the racial and ethnic composition of service users with that of the surrounding population, the analysis identified potential disparities in service usage and accessibility across the facilities. Even though surveys were administered at the Factoria facility, the data was excluded from this assessment due to incompleteness.

Data Source(s)

Population demographic data for areas surrounding the Haz Waste Program collection facilities were sourced from the 2018-2022 ACS 5-year estimates, collected using the US EPA's EJScreen tool (Version 2.3). Data on the race and ethnicity of HHW collection customers were derived from two survey collection efforts. Customer data for the North Seattle facility were gathered by Haz Waste Program staff members from February to August 2023, while customer data for the Auburn and South Seattle facilities were collected by Resource Recycling Systems (RRS), a contracted service provider, from July to September 2024.

Results and Findings

Customer survey data suggested that White residents used services at Haz Waste Program collection facilities at a higher rate than BIPOC residents.

- Table 4 presents the number and proportion of residents by race and ethnicity living within a 5-mile radius of Haz Waste Program collection facilities compared to King County overall, using US Census Bureau ACS data. This information was useful for comparing the racial and ethnic composition of customers using HHW collection services surveys, as detailed in the results below.

Table 4. Race and Ethnicity of Residents Living in 5-Mile Buffer Surrounding Collections Facilities and King County Overall (2018-2022 ACS 5-Year Data)

Race and Ethnicity	North Seattle		Auburn		South Seattle		King County Overall	
	Residents	%	Residents	%	Residents	%	Residents	%
American Indian and Alaska Native	1,715	0.4	2,014	0.9	1,403	0.5	10,019	0.4
Asian or Asian American	57,315	14.0	28,394	13.2	58,634	19.0	435,379	19.3
Black or African American	15,732	3.8	21,974	10.2	39,029	12.7	144,187	6.4
Hispanic or Latino/a/x	27,771	6.8	36,996	17.2	38,102	12.4	228,873	10.2
Native Hawaiian or Pacific Islander	938	0.2	5,382	2.5	1,880	0.6	16,415	0.7
Two or More Races	27,502	6.7	16,825	7.8	19,980	6.5	147,298	6.5
White	276,378	67.5	102,374	47.5	147,319	47.8	1,260,271	55.9
Other Race	1,838	0.4	1,493	0.7	1,825	0.6	11,929	0.5
Total Population	409,189	100	215,452	100	308,172	100	2,254,371	100.0

- The demographics of residents living near collection facilities vary substantially. Notable trends include that in areas surrounding the North Seattle facility, White residents were overrepresented, while Native Hawaiian or Pacific Islander residents were underrepresented. In contrast, the areas surrounding the Auburn facility indicated an overrepresentation of residents identifying as American Indian or Alaska Native, Black or African American, and Native Hawaiian or Pacific Islander. Additionally, in the regions surrounding the South Seattle facility, Black or African American residents were similarly overrepresented.

  Table 5 presents the self-reported race and ethnicity of customers using HHW collection services by facility and based on data collected from customer surveys.

- While White residents constituted less than 60% of the overall population in King County, approximately 80% or more of customers who provided their race and ethnicity while using Haz Waste Program collection facilities identified as White. Additionally, White residents comprised roughly 50% of those living within a 5-mile radius of the Auburn and South Seattle facilities. Yet, approximately 80% of customers at these facilities identified as White. This disparity highlighted significant differences in the demographic composition of customers using the collection facilities compared to the surrounding population.

- Stark disparities were evident when examining other racial and ethnic groups. Residents identifying as Asian or Asian American accounted for approximately 8% of customers across the three surveys, while they represented nearly 20% of the total King County population. Similarly, residents identifying as Hispanic or Latino/a/x made up about 3% of surveyed customers, yet they constituted over 10% of the overall population in King County. Additionally, residents identifying as Black or African American represented approximately 2% of surveyed customers, although they accounted for over 6% of the total King County population.

- An examination of the disparities between customer survey data and the surrounding population data at specific facilities also revealed significant differences. For instance, those identifying as Hispanic or Latino/a/x were heavily overrepresented in the areas surrounding the Auburn facility, comprising 17.2% of the local population compared to 10.2% overall. However, they were only 3.7% of survey respondents at this location.

- Response rates indicated that most residents were willing to provide their race and ethnicity information while using services at collection facilities. However, there was a significantly higher nonresponse rate for race and ethnicity at North Seattle (27%) compared to Auburn (8%) and South Seattle (9%) facilities. It remains unclear why there is such a large discrepancy in response rates.

Table 5. Race and Ethnicity of Customers Using Collections Services by Facility (Customer Survey Data, 2023-2024)

Race and Ethnicity	North Seattle			Auburn			South Seattle		
	Customers	%	% Respondents	Customers	%	% Respondents	Customers	%	% respondents
American Indian or Alaska Native	49	0.6	0.9	2	0.6	0.6	3	0.8	0.9
Asian or Asian American	429	5.6	7.8	26	7.4	8.0	25	7.1	7.7
Black or African American	38	0.5	0.7	4	1.1	1.2	14	4.0	4.3
Hispanic or Latino/a/x	116	1.5	2.1	12	3.4	3.7	7	2.0	2.2
Native Hawaiian or Pacific Islander	14	0.2	0.3	5	1.4	1.5	3	0.8	0.9
Two or More Races	115	1.5	2.1	10	2.8	3.1	16	4.5	5.0
White	4,745	62.4	85.8	266	75.4	81.8	255	72.2	78.9
Middle Eastern*	21	0.3	0.4	–	–	–	–	–	–
Other*	2	0.0	0.0	–	–	–	–	–	–
Non-Response or Unknown	2,075	27.3	–	28	7.9	–	30	8.5	–
Total	7,604	100	100	353	100	100	353	100	100

* Survey conducted at the North Seattle facility included different response options than those in the Auburn and South Seattle surveys.

Limitations

- Variability in survey administration across facilities has led to differences in data collection methods. At the North Seattle facility, surveys were administered by Haz Waste Program staff members, while contractor-led efforts were used at the Auburn and South Seattle facilities. This inconsistency may have introduced variability in the results, as evidenced by a significantly higher nonresponse rate for race and ethnicity at North Seattle (27%) compared to Auburn (8%) and South Seattle (9%). These discrepancies may arise from differing protocols in the administration of customer surveys, particularly in how nonresponses were recorded.

- There was also a potential nonresponse bias to consider. Although the overall survey nonresponse rates were modest, the race and ethnicity of nonrespondents remained unknown, which could skew the results if customers who did not report their race and ethnicity differ systematically from the overall customer population. For instance, if White individuals were less likely to report their race and ethnicity, the data could underestimate the proportion of White customers. Conversely, if BIPOC customers were less likely to provide their information, the results may not accurately reflect their representation. To assess this potential bias, a secondary analysis (not shown) examined the ZIP codes of nonrespondents at the North Seattle facility. The findings indicated that nonrespondents were more likely to reside in areas with a higher percentage of White residents, implying that the survey may slightly underestimate the proportion of White customers. Even though this suggests some degree of nonresponse bias, the overall patterns observed in the analysis remain valid. The findings of disparities in service usage are supported by multiple data sources and are consistent across various methodologies.

- At the time of the analysis, this study could not include the Factoria collections facility due to an insufficient number of completed and submitted surveys. There was confusion and concern from specific facility staff members regarding their job responsibilities related to administering surveys for onsite data collection. It took time to clarify these responsibilities, which delayed the data collection process. Additionally, there was further confusion about how to properly administer the forms to customers. The demographic data collection forms were provided to customers for completion but were not collected afterward. The proposals for addressing data collection issues at this facility, as well as others, are outlined in the Opportunities for Improvement and Next Steps section of this report.

- While the survey provided descriptive demographic data, it offered limited insight into the underlying reasons for disparities in service use. The survey did not explore potential barriers related to transportation, awareness, or cultural preferences, which may further contribute to discrepancies in service accessibility.

Collections Services: Facility HHW Customer ZIP Codes Analysis

Purpose

Explore the relationship between HHW service usage and demographic factors across King County ZIP codes.

Approach

This assessment analyzed the relationship between the rate of customers who used HHW collection services in 2023 and key demographic variables at the ZIP code level. Specifically, this analysis assessed whether the rate of service usage within a King County ZIP code was associated with factors such as racial and ethnic composition, income levels, and language spoken at home. The goal was to determine if ZIP codes with higher proportions of White, higher-income, and English-speaking residents were more likely to use Haz Waste Program services, in contrast to ZIP codes with higher proportions of BIPOC, lower-income, and non-English-speaking residents.

Each analysis examined the relationship between two variables at the ZIP code level:

- HHW Collections Customer Rate: This measure was calculated as the number of HHW customers in a ZIP code divided by the total population in that ZIP code. To facilitate easier interpretation, the rate was multiplied by 1,000, resulting in the number of customers per 1,000 residents in that ZIP code.
- Proportion of Residents in Key Demographic Groups: The proportions of the demographic indicators of interest by ZIP code were provided by data from the ACS. This assessment examined the proportion of residents who 1) identified as BIPOC, 2) lived at or near poverty, and 3) spoke a language other than English at home.

Two approaches were implemented to evaluate the correlation between ZIP code population demographics and customer rates:

- Spearman's Correlation: This test measured whether, as the rate of customers in a ZIP code increased, the proportions of demographic indicators tended to increase or decrease. It provided a correlation coefficient that indicated the strength and direction of this relationship.
- Quintile Approach: ZIP codes were ranked by demographic indicators and grouped into five equal-sized buckets, or "quintiles." Quintile 1 included the lowest fifth of ZIP codes for this indicator, while Quintile 5 included the highest. Customer rates were then compared across these groups to identify any emerging trends.

Data Source(s)

Internal Haz Waste Program data on the number and ZIP codes of all customers receiving collection services in the 2023 calendar year were extracted from the Moderate Risk Waste (MRW) reporting database, which includes data from all facilities and Wastemobile events. The database contained a total of 63,683 customers, of whom 59,418 had valid ZIP codes located in King County (Table 6). Population

demographic data by ZIP Code Tabulation Area (ZCTA) were sourced from the 2018-2022 ACS 5-year estimates.

Table 6. Number of Customer ZIP Codes by Facility and ZIP Code Type (MRW Database, 2023)

Facility	King County ZIP Codes	ZIP Codes Outside of King County	Not Valid ZIP Code	Facility Total
Auburn	7,859	179	1,061	9,099
Factoria	17,444	121	1,213	18,778
North Seattle	15,998	46	428	16,472
South Seattle	8,722	15	252	8,989
Wastemobile	9,395	310	640	10,345
Total	59,418	671	3,594	63,683

Results and Findings

Analyses of customer ZIP code data suggested an inverse relationship between the rate of service usage in a ZIP code and all three demographic indicators examined. Specifically, as the percentage of residents who were BIPOC, low income, or speak non-English languages at home increased within a ZIP code, the rate of usage of HHW collection services in that ZIP code tended to decline.

- Table 7 presents the five King County ZIP codes with the highest and lowest rates of customers using HHW collection services at the four fixed facilities, along with the three demographic indicators analyzed. Among the ZIP codes listed, those with fewer BIPOC residents, lower income levels, and non-English speaking residents generally exhibited higher rates of collection customers per capita.

Spearman's Correlation Testing

- Figure 1 presents the results of a Spearman's correlation test conducted between ZIP code-level variables, including the HHW customer rate and three demographic indicators: the percentage of residents who are BIPOC, those classified as low income, and individuals who speak non-English languages at home. The correlation matrix highlights key relationships among these variables.

- The Spearman's correlation test revealed a moderate but statistically significant negative relationship between the HHW customer rate and all three demographic indicators, with correlation coefficients (rho) ranging from -0.38 to -0.44. The negative values indicated that as the percentage of residents who were BIPOC, low income, or spoke non-English languages increased within a ZIP code, the rate of HHW service usage tended to decrease.

- The three demographic indicators were positively correlated, suggesting a significant overlap among these characteristics across ZIP codes. A strong positive correlation (rho = 0.91) existed between the percentage of BIPOC residents and non-English speaking residents, along with

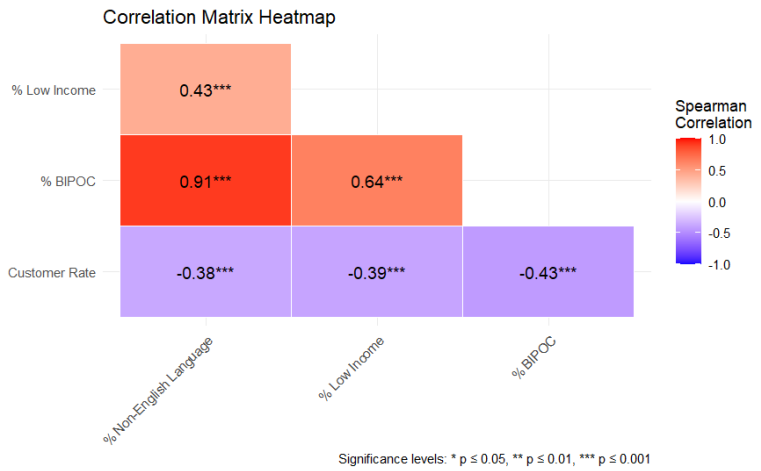
moderate correlations between BIPOC residents and low-income residents (rho = 0.64) and between low-income residents and non-English speaking residents (rho = 0.43).

- The p-values of less than 0.01 for all tests indicated that these relationships were highly unlikely due to random chance, providing evidence of a meaningful association between these variables.

Table 7. King County ZIP Codes with Lowest and Highest Customer Rates and Demographic Indicators (MRW Database, ACS 2018-2022)

ZIP Code	Location	# of HHW Customers	Total Population	Customer Rate	Rank	% of BIPOC Residents	% of Low-Income Residents	% of Non-English Speaking Residents
98050	Preston	34	73	465.8	1	0.0	0.0	0.0
98070	Vashon	802	10,939	73.3	2	13.2	17.0	5.6
98177	Seattle	1,438	21,114	68.1	3	23.1	11.4	14.2
98040	Mercer Island	1,701	25,464	66.8	4	34.7	9.6	24.0
98134	Seattle	53	852	62.2	5	44.1	61.1	6.8
98104	Seattle	94	15,052	6.2	75	51.8	42.2	31.6
98101	Seattle	100	16,302	6.1	76	48.2	18.5	32.6
98121	Seattle	98	20,562	4.8	77	52.3	18.9	39.3
98354	Milton	20	8,146	2.5	78	25.6	17.5	18.0
98195	Seattle	3	2,398	1.3	79	56.7	NA	36.5

Figure 1. Correlation Between Customer Rates and Demographic Indicators at the ZIP Code Level (MRW Database, ACS 2018-2022)



Notes: The correlation matrix displays Spearman's correlation coefficients, which measure the strength and direction of relationships between variables. A coefficient closer to 1 indicates a strong positive correlation (both factors increase together), while a coefficient closer to -1 indicates a strong negative correlation (one factor increases as the other decreases). Values near 0 suggest little to no relationship. For example, a correlation coefficient of -0.43 means that an increase in the percentage of BIPOC residents tends to align with a moderate decrease in service usage.

Quintile Approach

Customer rates by proportion of residents identifying as BIPOC

- Table 8 and Figure 2 illustrate the distribution of customers and the population across five quintiles of ZIP codes ranked by the proportion of BIPOC residents, compared to HHW customer rates. Quintile 1 consists of ZIP codes with the lowest proportions of BIPOC residents, while Quintile 5 includes those with the highest proportions. The analyses only included ZIP codes from King County; ZIP codes outside of King County or those for which no demographic data was available in the ACS were left blank.

- The quintiles consisted of between 16 and 19 ZIP codes, representing approximately 9% to 26% of the King County population served. The proportion of BIPOC residents across the quintiles varied significantly, ranging from less than 20% to over 60%, highlighting the substantial racial and ethnic segregation among King County residents.

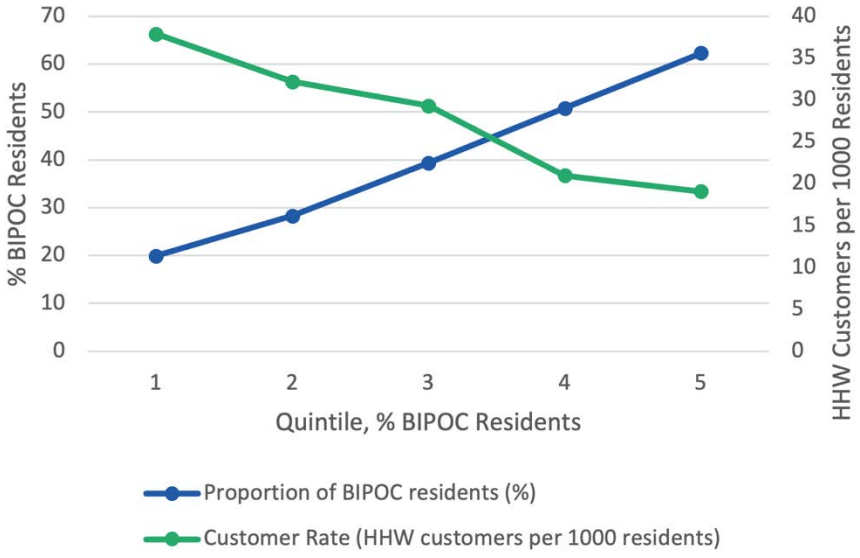
- Customer rates across the quintiles ranged from 16.2 to 37.9 customers per 1,000 residents. There was a unidirectional, inverse relationship between the proportion of BIPOC residents and the HHW customer rate. Overall, this analysis suggested a trend in which ZIP codes with higher proportions of BIPOC residents tended to have lower rates of service usage.

Table 8. HHW Customer Rates and Proportions of Residents Identifying as BIPOC (Internal HHW Customer ZIP Code Data 2023 and 2018-2022 ACS 5-Year Data)

Quintile BIPOC %		# of King County ZIP Codes	Total Population	% of Population	HHW Customers	% of HHW Customers	% BIPOC	Customers Per 1,000 Residents
1	ZIP codes with lowest proportions of BIPOC residents	16	207,051	9.1	7,852	12.3	19.9	37.9
2		16	436,301	19.2	14,060	22.1	28.3	32.2
3		16	525,033	23.1	15,393	24.2	39.4	29.3
4		16	518,759	22.8	10,885	17.1	50.8	21
5	ZIP codes with highest proportions of BIPOC residents	19	587,581	25.8	11,218	17.6	62.3	19.1
	Outside of King County or no ZIP code data	36	–	–	4,275	6.7	–	–
	Total	119	2,274,725	100	63,683	100	–	–

Notes: The dataset included 36 ZIP codes that were either located outside of King County or had no available demographic data in the ACS.

Figure 2. HHW Customer Rates and Proportions of Residents Identifying as BIPOC (Internal HHW Customer ZIP Code Data 2023 and 2018-2022 ACS 5-Year Data)



Customer rates by proportion of low-income residents

- Table 9 and Figure 3 illustrate the distribution of customers and the population across five quintiles of ZIP codes ranked by the proportion of residents living at or near poverty (defined as less than 200% of the federal poverty line), which served as the demographic indicator for low-income residents, in comparison to HHW customer rates. Quintile 1 included ZIP codes with the lowest proportions of low-income residents, while Quintile 5 encompassed those with the highest proportions. The analyses included only King County ZIP codes; ZIP codes outside of King County, or those for which no demographic data was available in the ACS were left blank.

- The quintiles consisted of between 15 and 18 ZIP codes, representing approximately 12% to 26% of the King County population served. The proportion of low-income residents across the quintiles ranged from less than 8% to over 30%, highlighting the significant economic segregation among King County residents.

- Customer rates across the quintiles ranged from 15.9 to 34.4 customers per 1,000 residents. There was a unidirectional, inverse relationship between the proportion of low-income residents and the HHW customer rate.

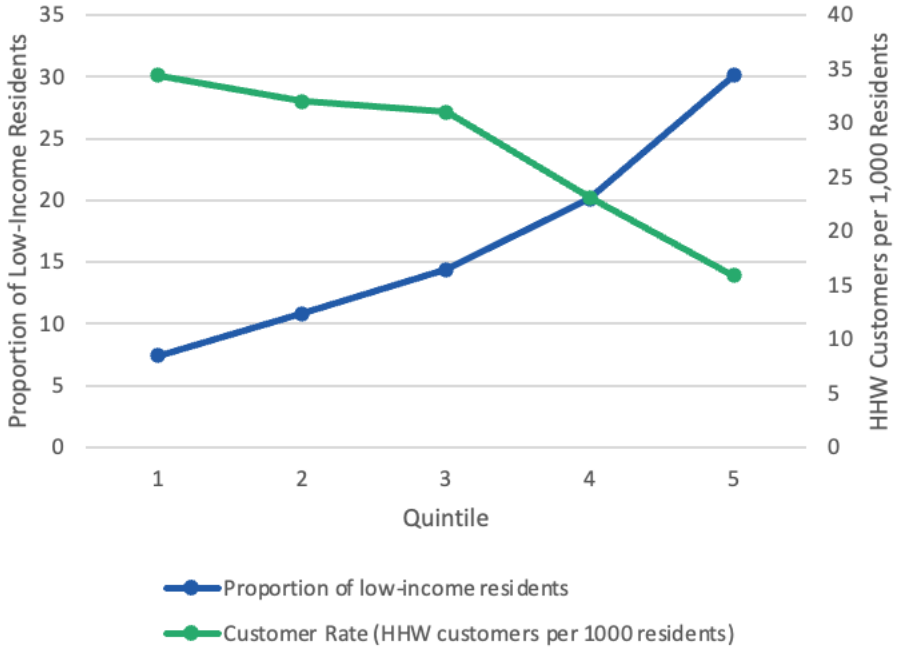
- Overall, this analysis indicated a trend in which ZIP codes with higher proportions of low-income residents tended to have lower rates of service usage.

Table 9. HHW Customer Rates and Proportions of Low-Income Residents (Internal HHW Customer ZIP Code Data 2023 and 2018-2022 ACS 5-Year Data)

	Quintile Low Income %	# of King County ZIP Codes	Total Population	% of Population	HHW Customers	% of Customers	Low Income %	Customers Per 1000 Residents
1	ZIP codes with lowest proportions of low-income residents	17	262,893	11.7	9,049	14.2	7.4	34.4
2		15	458,281	20.4	14,654	23	10.8	32
3		16	529,462	23.6	16,403	25.8	14.4	31
4		16	485,172	21.6	11,224	17.6	20.1	23.1
5	ZIP codes with highest proportions of low-income residents	18	507,940	22.6	8,075	12.7	30.1	15.9
	Outside of King County or no ZIP code data	37	–	–	4,278	6.7	–	–
	Total	119	2,243,748	100	63,683	100	–	–

Notes: The dataset included 37 ZIP codes that were either located outside of King County or had no available demographic data in the ACS.

Figure 3. HHW Customer Rates and Proportions of Low-Income Residents (Internal HHW Customer ZIP Code Data 2023 and 2018-2022 ACS 5-Year Data)



Customer rates by proportion of non-English speaking residents

- Table 10 and Figure 4 illustrate the distribution of customers and the population across five quintiles of ZIP codes ranked by the proportion of residents who spoke a language other than English at home, compared with rates of HHW customers. Quintile 1 included ZIP codes with the lowest proportions of non-English speaking residents, while Quintile 5 encompassed those with the highest proportions. The analyses included only King County ZIP codes; ZIP codes outside of King County or those for which no demographic data was available in the ACS were left blank.

- The quintiles consisted of between 16 and 19 ZIP codes, representing approximately 9% to 29% of the King County population served. The proportion of residents speaking a language other than English across the quintiles ranged from 11% to over 43%, highlighting the significant language segregation among King County residents.

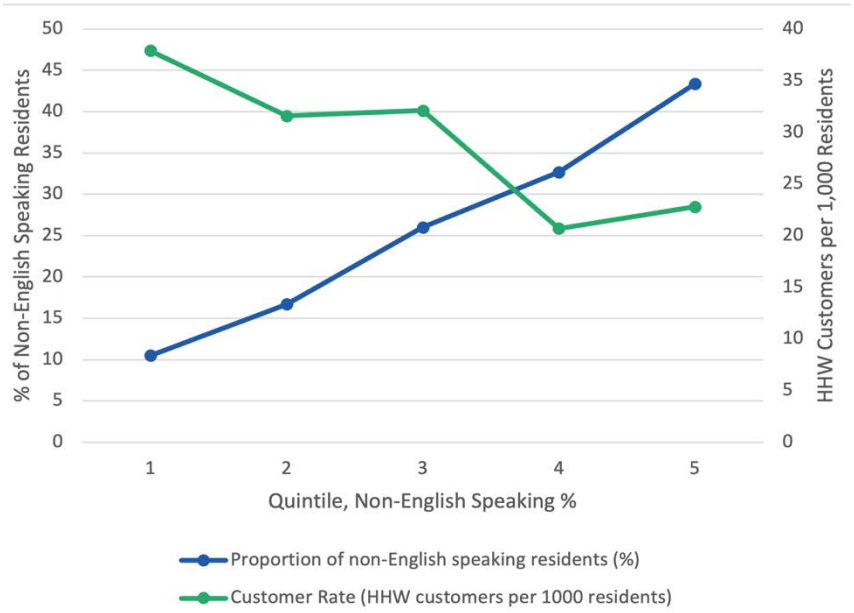
- Customer rates across the quintiles ranged from 22.8 to 37.9 customers per 1,000 residents. There was a general inverse trend between the proportion of non-English speaking residents and the HHW customer rate. Overall, this analysis indicated a trend in which ZIP codes with higher proportions of non-English speaking residents tended to have lower rates of service usage.

Table 10. HHW Customer Rates and Proportions of Non-English Speaking Residents (Internal HHW Customer ZIP Code Data 2023 and 2018-2022 ACS 5-Year Data)

	Quintile Non-English Speaking %	# of King County ZIP Codes	Total Population	% of Population	HHW Customers	% of Customers	Non-English Speaking %	Customers Per 1000 Residents
1	ZIP codes with lowest proportions of non-English speaking residents	16	196,183	9.1	7,431	11.7	10.5	37.9
2		16	388,624	18.1	12,279	19.3	16.7	31.6
3		16	518,904	24.1	16,679	26.2	26	32.1
4		16	428,428	19.9	8,857	13.9	32.7	20.7
5	ZIP codes with highest proportions of non-English speaking residents	19	619,931	28.8	14,162	22.2	43.4	22.8
	Outside of King County or no ZIP code data	36	–	–	4,275	6.7	–	–
	Total	119	2,152,070	100	63,683	100	–	–

Notes: The dataset included 36 ZIP codes that were either located outside of King County or had no available demographic data in the ACS.

Figure 4. HHW Customer Rates and Proportions of Non-English Speaking Residents (Internal HHW Customer ZIP Code Data 2023 and 2018-2022 ACS 5-Year Data)



Limitations

- ZIP codes served as proxies for customer demographic characteristics rather than providing individual-level data. The analysis was conducted at the ZIP code level, meaning that the results reflected correlations between demographic characteristics and service usage rates at the aggregate level. This approach could not capture individual behaviors or service usage patterns, and any observed associations might not have held true for individuals within the ZIP code.

- The analysis considered only a limited set of demographic variables, including racial and ethnic composition, income, and language. Other unmeasured factors, such as the distance to HHW facilities, access to public transportation, and local outreach efforts, could also have influenced service usage rates but were not accounted for in this analysis.

- Additionally, the representation of income and language data was simplified to proportions of residents living at or near poverty or speaking a language other than English at home. These broad categories may have oversimplified the complex socioeconomic and linguistic dynamics present within King County communities.

Collections Services: Wastemobile HHW Customer Survey

Purpose

Examine the demographic characteristics of Wastemobile HHW customers to identify potential disparities in service usage.

Approach

This analysis summarized the demographic characteristics of Wastemobile customers, including race and ethnicity, language spoken, and income. Where possible, these descriptive statistics were presented alongside data on the overall King County population to highlight potential disparities in service usage and accessibility.

Data Source(s)

The demographic information for Wastemobile customers was obtained through surveys. These surveys were administered in English at four multi-day Wastemobile collection events held between May and October 2024. The events took place in the cities of Kirkland (May 10-12), Des Moines (July 19-21), Kent (September 6-8), Covington (September 6-8), and Renton (October 11-13).

Results and Findings

Customer survey data indicated that White residents used services at Haz Waste Program Wastemobile collection events at a higher rate than would be expected based on overall King County demographics. Additionally, the results suggested that residents with both low and high incomes were less likely to use these services, while middle-income residents were more likely to participate in Wastemobile collections.

- Table 11 presents the self-reported race and ethnicity of customers using Wastemobile collection services as gathered from customer surveys. While White residents comprised less than 60% of the overall population in King County, approximately 70% or more of customers who provided their race and ethnicity during Wastemobile collection services identified as White.

- Other racial and ethnic groups were significantly underrepresented in this survey compared to the overall King County population. Residents identifying as Hispanic or Latino/a/x made up only 2% of the customers surveyed, whereas they represented 10.2% of the population. Similarly, Black or African American residents accounted for 3.1% of customers, in contrast to 6.4% of the overall population.

- Table 12 presents the languages spoken at home by customers using Wastemobile collection services, as collected from customer surveys (n = 788). Customers were able to report more than one language.

Table 11. Race and Ethnicity of Wastemobile Customers (Customer Survey Data, 2024)

Race and Ethnicity	WMB Customers	% Total	% Those Reporting	King County Overall*
American Indian or Alaska Native	6	0.8	0.8	0.4
Asian or Asian American	116	15.7	16.3	19.3
Black or African American	22	3.0	3.1	6.4
Hispanic or Latino/a/x	14	1.9	2.0	10.2
Native Hawaiian or Pacific Islander	4	0.5	0.6	0.7
Two or More Races	29	3.9	4.1	6.5
White	507	68.7	71.3	55.9
Other	13	1.8	1.8	0.5
Middle Eastern or North African	3	0.4	0.4	–
Nonresponse or Unknown	24	3.3	–	–
Total	738	100	100	100

Notes: King County Overall estimates were from 2018-2022 ACS 5-year data.

Table 12. Language Spoken at Home of Wastemobile Customers (Customer Survey Data, 2024)

Language	Number of Customers	Percent of Customers
English	687	93.1
Mandarin	18	2.4
Vietnamese	15	2.0
Cantonese	11	1.5
Spanish	11	1.5
Tagalog	11	1.5
Japanese	6	0.8
Other	29	3.5
Total	788	106.3*

* Some of the 788 respondents reported speaking more than one language.

- In this survey, 93% of Wastemobile customers reported speaking English. This finding was consistent with the estimated 93.5% of adult residents in King County who spoke only English or spoke English "very well," according to the 2023 ACS data (Table 13).

- Additionally, 13.2% of customers reported speaking a language other than English at home, with some respondents indicating that they spoke both English and another language.

- Although an estimated 20% of King County citizens over the age of 18 spoke a language other than English at home, most of these residents (68%) reported speaking English "very well" (Table 13). However, since these data only included US citizens, it is likely that the proportion of residents in King County who spoke English less than "very well" was higher than the 6.7% estimated in the ACS data.

- The data did not reflect the preferences of residents regarding the languages in which they prefer to receive information about Haz Waste Program services. It is possible that some residents who spoke English "very well" would prefer to receive information in other languages.

- Overall, the data alone did not provide evidence that non-English-speaking residents were less likely to use Wastemobile services; however, further research is needed to draw definitive conclusions.

Table 13. Languages Spoken at Home Among King County Adults (2019-2023 ACS 5-Year Data)

Language group	All Citizens 18 Years and Over		Speak English Only or Speak English "Very Well"		Speak English Less Than "Very Well"	
	Estimate	Percent	Estimate	Percent	Estimate	Percent
Total	1,547,797	–	1,447,086	93.5	100,711	6.5
Speak only English	1,234,089	79.7	–	–	–	–
Speak a language other than English	313,708	20.3	212,997	67.9	100,711	32.1
Spanish	61,652	4.0	47,745	77.4	13,907	22.6
Other languages	252,056	16.3	165,252	65.6	86,804	34.4

Notes: Data were from ACS 2023 5-year data, S1601 Language Spoken at Home Census Bureau Table[5]

- Table 14 presents the self-reported income of customers using Wastemobile collection services as collected from customer surveys. The estimates of household incomes for the overall King County population were included for comparison.

- The income distribution of Wastemobile customers differed from that of the overall King County population, revealing notable patterns of underrepresentation and overrepresentation. Low-income residents were underrepresented because only 3.5% of customers reported incomes under $25,000, compared to 9.4% of households countywide. In contrast, middle-income residents were overrepresented, with customers earning between $75,000 and $149,999 comprising 41.0% of those reporting income, while only 28.0% of county households fell within this range. High-income residents were also underrepresented as households earning $200,000 or more accounted for just 19.9% of respondents compared to 28.3% countywide. Additionally, over 20% of customers did not report their household income, which introduced the potential for selection and nonresponse bias when interpreting these results.

Table 14. Total Household Income of Wastemobile Customers (Customer Survey Data, 2024)

Income	Customers	% Total	% Those Responding	King County Households Overall*
Less than $25,000	20	2.7	3.5	9.4
$25,000 to $49,999	57	7.7	9.9	10.4
$50,000 to $74,999	75	10.2	13.1	11.5
$75,000 to $99,999	102	13.8	17.8	10.3
$100,000 to $149,999	133	18.0	23.2	17.7
$150,000 to $199,999	73	9.9	12.7	12.4
$200,000 or more	114	15.4	19.9	28.3
Rather Not Answer or Nonresponse	164	22.2	–	–
Total	738	100	100	100

** Data were from ACS 2023 5-year data, S1901 Income in the Past 12 Months Census Bureau Table*[6]

Limitations

- The accessibility of survey language was a concern, since surveys were available in Spanish, Vietnamese, and Mandarin, yet nearly all were administered in English (98.7%). This limited participation from non-English-speaking residents may have underestimated service usage or interest among populations with limited English proficiency.

- The survey sample representation was relatively small with demographic data collected from only 738 customers compared to an average of over 10,000 Wastemobile customers annually. The data were gathered during four collection events within a limited time frame, which may not reflect the full diversity of Wastemobile users.

- Potential nonresponse bias was evident because a significant proportion of customers did not respond to certain survey questions, particularly regarding income. This nonresponse introduced potential biases and limits the completeness of the dataset.

- Furthermore, while the survey provided descriptive demographic data, it offered limited insight into service barriers. The survey did not explore underlying reasons for disparities in service use, such as transportation barriers, awareness of services, and cultural preferences, which remain unexamined.

Collections Services: Wastemobile HHW Collection Locations in Highly Impacted Areas

Purpose

Understand the reach and demographics of customers using various Collections services, including those at fixed facilities, Wastemobile services, and city and tribal events.

Approach

This analysis examined the geographic distribution of Wastemobile collection events and assessed the proportion of these services delivered in communities significantly impacted by environmental and socioeconomic risk factors. Geocoded addresses for event locations were mapped and overlaid with data from the EHD mapping tool to identify Wastemobile collection services occurring in highly impacted census tracts within King County.

Event locations were classified into five groups ranked by an overall EHD index. Quintile 1 included the 20% of census tracts that were least impacted by environmental and social risk factors, while Quintile 5 encompassed the 20% most impacted. This approach helped determine whether Wastemobile services were directed toward communities most affected by environmental pollution and that may have encountered significant barriers to accessing Haz Waste Program services.

Data Source(s)

Information regarding Wastemobile collection locations for the 2024 calendar year (n = 20) was obtained from the Haz Waste Program website,[7] which identified a total of 20 locations. Additionally, the EHD mapping data was downloaded from the WA DOH website[8] and subsequently rescaled to align with specific parameters relevant to King County.[9]

Results and Findings

Wastemobile collection events were distributed evenly across communities as indicated by the rankings from the EHD mapping tool. This distribution suggested that these services may not have been effectively prioritized toward the communities most significantly impacted by environmental and social risk factors.

- Only 15% of Wastemobile events occurred in the most overburdened communities in King County. This finding suggested that Wastemobile services were not being equitably delivered to the communities with the highest environmental and socioeconomic burdens.

- The relatively even distribution of events across Quintiles 1, 2, and 3, which collectively accounted for 85% of the events, may have reflected logistical considerations such as ease of access to acceptable sites, community requests, or proximity to fixed facilities. However, this approach may have inadvertently deprioritized the communities with the greatest need for hazardous waste collection services. Table 15 presents the distribution of Wastemobile services by EHD quintile.

Table 15. Wastemobile Collections Event Locations by EHD Quintile (Internal Data and WA DOH EHD V2 Data Rescaled to King County, 2024)

	Quintile EHD Score	Wastemobile Events	% of Events
1	Census tracts least impacted by environmental health disparities	5	25
2		6	30
3		6	30
4		0	0
5	Census tracts most impacted by environmental health disparities	3	15
	Total	20	100

Limitations

- The analysis exhibited several limitations that affected its comprehensiveness. The evaluation had a limited scope, focusing solely on the EHD mapping tool to assess the distribution of Wastemobile events. This approach did not account for other critical factors that could influence the geographic placement of collections events, such as proximity to permanent hazardous waste facilities, regional equity, historical service demand, or logistical considerations. These additional factors could provide essential context for understanding the observed distribution patterns and might help explain why certain areas were over- or underrepresented in the data.

- The small sample size of only 20 events analyzed restricted the robustness of the conclusions regarding service distribution patterns. This limited dataset may not accurately reflect broader trends or variations in service delivery.

- The data collected lacked participant or tonnage data. While it focused on the geographic distribution of event locations, it did not include information on the number of customers served or the amount of hazardous waste collected at each location. As a result, it remained unclear whether the events experienced similar or different levels of service usage across areas ranked by EHD scores.

City and Tribal Events: Analysis of Locations in Highly Impacted Areas

Purpose

Understand the geographic distribution of city and tribal collection events in highly impacted areas.

Approach

This analysis examined the geographic distribution of city and tribal collection events, focusing on the extent to which these services reached communities most affected by environmental and socioeconomic factors. The analysis involved mapping geocoded addresses for both collection and ongoing battery collection locations and then overlaying the information with data from the EHD mapping tool. This approach enabled the identification of collection events within highly impacted census tracts across King County.

Event locations were classified into five groups ranked by an overall EHD index, with Quintile 1 representing the 20% of census tracts least impacted by environmental and social risk factors, and Quintile 5 representing the 20% most impacted. This methodology helped determine whether these services were directed toward communities most impacted by environmental pollution and may have encountered the greatest barriers to accessing Haz Waste Program services.[10]

Data Source(s)

The location information for city and tribal collection events for the 2024 calendar year was obtained from the Haz Waste Program Policy and Planning team. The EHD mapping data was downloaded from the WA DOH website[11] and rescaled to reflect parameters specific to King County.[12]

Results and Findings

The city and tribal collection events were distributed relatively evenly across communities ranked by the EHD mapping tool. However, a higher proportion of events occurred in moderately impacted areas, while a lower proportion took place in the most highly impacted areas. Overall, this evaluation suggested that these services were not necessarily well directed toward communities most affected by environmental and social risk factors.

- Quintile 4 accounted for the largest share of combined HHW and battery collection events, with 36% of all events occurring in these census tracts. This indicated a concentration of services in moderately impacted areas rather than in those with the highest or lowest levels of environmental and socioeconomic disparities.

- Only 8% of the total events were held in Quintile 5, which comprised the areas most affected by environmental and social disparities. This represented a potential service gap for communities that may have had the greatest need for hazardous waste and battery collection services. Table 16 presents the distribution of city and tribal services by EHD Quintile.

Table 16. City and Tribal HHW and Battery Collections Events by EHD Index (Internal Data and WA DOH EHD V2 Data Rescaled to King County, 2024)

	Quintile EHD Score	HHW Collection Events	% HHW Events	Ongoing Battery Collection Locations	% Battery Collection Locations	Total Events	% Total Events
1	Census tracts least impacted by environmental health disparities	9	33.3	2	8.7	11	22.0
2		3	11.1	2	8.7	5	10.0
3		3	11.1	6	26.1	9	18.0
4		10	37.0	8	34.8	18	36.0
5	Census tracts most impacted by environmental health disparities	2	7.4	2	8.7	4	8.0
	Outside of King County	–	–	3	13.0	3	6.0
	Total	27	100	23	100	50	100

Notes: The three active battery collection sites in the northern part of Bothell were situated in Snohomish County and, as a result, did not have a King County EHD index score.

Limitations

- The analysis had a limited scope, focusing solely on the EHD mapping tool to assess the distribution of city and tribal events. It did not account for other factors that may have influenced the geographic placement of collection events, such as the availability of suitable sites, proximity to permanent hazardous waste facilities, regional equity, historical service demand, or other logistical considerations. These factors could have provided additional context for the observed distribution and may have helped explain why certain areas were either overrepresented or underrepresented.

- Additionally, the analysis lacked participant and tonnage data, concentrating on the geographic distribution of event locations without considering the number of participants or the amount of hazardous waste collected at each collection site. It remains unclear whether events experienced similar or different levels of service use across areas ranked by EHD scores.

Business Services Program: Technical Assistance Visits in Highly Impacted Areas

Purpose

Understand the geographic distribution and demographics of customers receiving technical assistance from the Business Services Program (BSP).

Approach

This analysis examined the geographic distribution of SQGs[13] receiving pollution prevention technical assistance services and assessed the proportion of these services delivered in communities significantly impacted by environmental and socioeconomic risk factors. Geocoded addresses for all visited SQGs were mapped and overlaid with data from the EHD mapping tool to identify technical assistance services occurring in highly impacted census tracts within King County.

The addresses of SQGs were classified into five groups ranked by an overall EHD index, with Quintile 1 representing the 20% of census tracts least impacted by environmental and social risk factors, while Quintile 5 encompassed the 20% most impacted. This approach assisted in identifying whether pollution prevention services for SQGs were equitably distributed and highlighted potential gaps in service delivery to communities encountering the greatest environmental and social burdens.

Since SQGs could contribute to community pollution—such as through emissions into the environment or improper disposal of hazardous waste—there is a rationale for prioritizing these services in areas that are already overburdened by adverse environmental conditions.

Data Source(s)

The information on the addresses of SQGs was obtained from the Haz Waste Program Extranet database, which included details on all SQGs receiving technical assistance services from BSP during the 2024 calendar year. The EHD mapping data was downloaded from the WA DOH website[14] and subsequently rescaled to align with specific parameters relevant to King County.[15]

Results and Findings

Technical assistance services were disproportionately delivered to SQGs located in highly impacted areas, with approximately 40% of the visited SQGs and total visits occurring in the most affected census tracts. This distribution reflects the focus of BSP on achieving team and Haz Waste Program goals aimed at serving communities most likely to be exposed to hazardous materials and waste.

- Predominantly, technical assistance services were provided to SQGs situated in the most impacted census tracts. These areas accounted for 36.9% of the SQGs visited and 35.6% of total visits, significantly exceeding the percentages of their least impacted counterparts, which comprised only 8.2% of the SQGs visited and 7.5% of total visits. This trend remained evident even after accounting for the nearly 10% of visits that could not be geocoded for this analysis.

- These findings indicated that technical assistance services from BSP were largely delivered to SQGs located in communities experiencing the highest environmental and social disparities. Table 17 and Figure 5 present the distribution of unique SQGs receiving technical assistance services, as well as the total number of technical assistance visits by EHD Quintile.

- The possibility that SQGs were more concentrated in industrial areas with higher environmental pollution indicators should be acknowledged, since this could have resulted in these areas being more frequently classified as "highly impacted" in the EHD data. If this were the case, one might assert that the analysis presented an overly optimistic view of service equity because BSP field representatives would innately visit highly impacted areas due to the distribution of SQGs in King County.

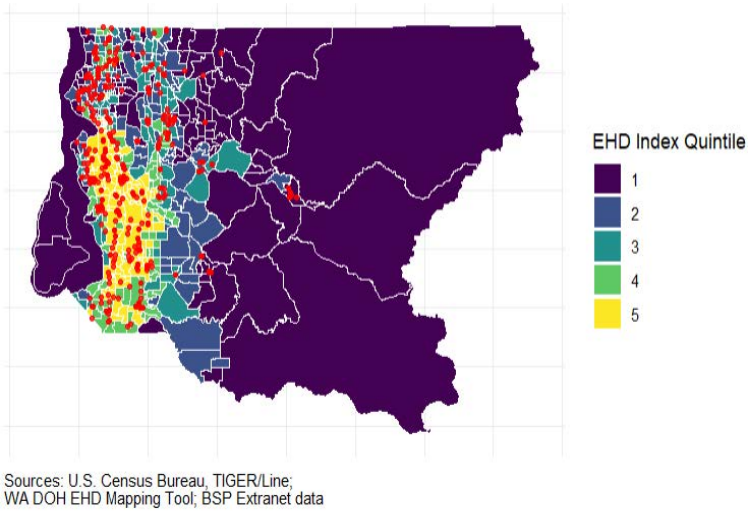
  However, secondary analyses (not shown) provided little evidence to support this concern. An examination of the geographic distribution of King County businesses in industries commonly associated with SQGs suggested that these entities were not disproportionately located in high-EHD areas. More importantly, when the analysis was conducted using socioeconomic indicators—such as the proportion of BIPOC or low-income residents—rather than the overall EHD score, the findings still demonstrated that visits were distributed in an equitable manner. This reinforced that BSP technical assistance services effectively reached priority communities and were independent of potential confounding factors related to SQG distribution.

Table 17. SQGs Receiving Technical Assistance Services and Total Visits by EHD Quintile (Extranet Data and WA DOH EHD V2 Data Rescaled to King County, 2024)

	Quintile EHD Score	SQGs Visited	% SQGs Visited	% SQGs Geocoded	Total Visits	% Total Visits	% Total Visits Geocoded
1	Census tracts least impacted by environmental health disparities	22	8.2	8.9	29	7.5	8.3
2		34	12.7	13.8	48	12.5	13.7
3		51	19.0	20.7	81	21.0	23.1
4		40	14.9	16.3	55	14.3	15.7
5	Census tracts most impacted by environmental health disparities	99	36.9	40.2	137	35.6	39.1
	Not Geocoded	22	8.2	–	35	9.1	–
	Total	268	100	100	385	100	100

Note: As of the completion of this report, some SQG addresses were unable to be successfully geocoded.

Figure 5. Technical Assistance Services by Environmental Health Disparities Index (Extranet Data, US Census Bureau, and WA DOH EHD V2 Data Rescaled to King County, Q1–Q4 2024)



Limitations

- This assessment was unable to successfully geocode addresses for approximately 10% of the SQGs visited. Specifically, latitude and longitude data could not be obtained, which is necessary to classify each SQG's census tract and associate the location with an EHD score. This limitation affects the ability to accurately analyze the distribution of services and may result in the under- or over-representation of certain areas in the analysis. However, it should be feasible to obtain latitude and longitude for most of these SQGs with sufficient time, such as by identifying entry errors in addresses or manually collecting data using online mapping tools.

- Additionally, while this analysis provided insights into service distribution, it did not evaluate the outcomes or effectiveness of the technical assistance provided, such as the pollution prevention actions taken by the SQGs. Understanding whether these services contributed to reducing pollution or improving practices in these areas would provide a more holistic overview of their impact on overburdened communities. Therefore, data on relevant outcomes, such as pollution prevention actions undertaken by an SQG, should be integrated into future analyses.

Business Services Program: Demographics of Technical Assistance Visits

Purpose

Understand the geographic distribution and demographics of customers receiving technical assistance from BSP.

Approach

This analysis summarized the race and ethnicity of individuals who were in direct contact with BSP field representatives for SQGs receiving on-site technical assistance services.

Data Source(s)

Information on the demographics of SQG site contacts was obtained from the Haz Waste Program Extranet database. The EHD mapping data was downloaded from the WA DOH website[16] and subsequently rescaled to align with specific parameters relevant to King County.

Results and Findings

The majority of site contacts at SQGs receiving technical assistance services from BSP were BIPOC, suggesting that pollution prevention assistance was directed toward SQGs owned by or employing BIPOC individuals.

- Table 18 presents the number and proportion of site contacts at SQGs receiving BSP services categorized by race and ethnicity. Demographic data for site contacts were collected in 234 instances across 175 SQG sites. Reporting these data proved challenging due to the fact that each SQG site can be visited multiple times, the race and ethnicity of the site contact can be recorded at each visit, and the same individual may be the contact during more than one visit.
- Race and ethnicity information was obtained for 75% of the SQGs visited, with some SQGs having more than one site contact providing information. Among the sites from which data was collected, the majority had at least one site contact who identified as BIPOC (66.7%).
- Similarly, most technical assistance visits involved interactions with a site contact who identified as BIPOC (65.8%). Table 19 presents the race and ethnicity reported by site contacts, stratified by the type of contact based on the total number of visits to SQGs.

- The distribution of race and ethnicity among site contacts varied significantly based on their role at the SQG. Nearly 80% of "owners" identified as BIPOC, suggesting that technical assistance services predominantly supported BIPOC-owned businesses. Conversely, site contacts identifying as White were prevalent in categories such as "Property, Community, or Apartment Manager" (70%) and "Supervisor or Manager" (61.9%), indicating a concentration in property and managerial roles.

Table 18. Race and Ethnicity of Site Contacts at SQGs Receiving Technical Assistance Services (Extranet Data, Q1–Q3 2024)

Race and Ethnicity	SQGs			SQG Contacts		
	Count	%	% Those Reporting	Count	%	% Those Reporting
American Indian or Alaska Native	2	0.9	1.1	2	0.9	0.9
Asian or Asian American	53	22.7	29.8	66	28.2	29.3
Black or African American	33	14.2	18.5	39	16.7	17.3
Hispanic or Latino/a/x	24	10.3	13.5	34	14.5	15.1
Two or More Races	1	0.4	0.6	1	0.4	0.4
White	61	26.2	34.3	77	32.9	34.2
Middle Eastern	4	1.7	2.2	6	2.6	2.7
Unknown or Prefer Not to Answer	9	3.9	–	9	3.8	–
No Demographic Data Obtained	58	24.9	–	–	–	–
Total	245	105.2*	100	234	100	100

** The SQG section of this table presents unique combinations of SQG, and site contacts categorized by race and ethnicity. The percentages exceed 100% because demographic information for 187 contacts was collected from 175 SQG sites (i.e., some SQGs had multiple site contacts reporting different races and ethnicities).*

Table 19. Race and Ethnicity of Site Contacts at SQGs Receiving Technical Assistance by Contact Type (Extranet Data, Q1–Q3 2024)

Type of Site Contact	Site Contact Race and Ethnicity								
	Total Site Contacts	% American Indian or Alaska Native	% Asian	% Black or African American	% Hispanic or Latino/a/x	% Two or More Races	% White	% Middle Eastern	% Unknown or Did Not Answer
EnviroStar	24	–	37.5	–	25.0	–	37.5	–	–
Office or Admin Staff	11	–	9.1	27.3	9.1	9.1	18.2	–	27.3
Other Employee	37	–	8.1	59.5	8.1	–	16.2	–	8.1
Owner	76	–	46.1	7.9	19.7	–	19.7	5.3	1.3
Property, Community, or Apartment Manager	20	5	10	15	–	–	70	–	–
Site Guide	29	3.4	13.8	3.4	24.1	–	48.3	–	6.9
Supervisor or Manager (not property managers)	21	–	9.5	19	9.5	–	61.9	–	–
Not Classified	16	–	62.5	–	–	–	25	12.5	–

Limitations

- Site contacts recorded during technical assistance visits varied widely in their roles, ranging from administrative staff to property managers, supervisors, and owners. These roles were often determined by who was available on-site at the time of the visit, which highlighted the limitation of site contacts as proxies. As a result, these contacts may not accurately represent the demographics of the workforce or business ownership at the SQGs, thereby limiting the effectiveness in understanding equity in service delivery to sites with BIPOC employees or BIPOC-owned businesses.

- It is important to note that 2024 marked the first year that BSP fully implemented demographic data collection in the field, following a trial period from August to December 2023. During the early stage of the data collection process, protocols required field representatives to ask at least one contact per visit for their race and ethnicity data. BSP successfully gathered data at 75% of the sites visited in Q1-Q3 of 2024. Moving forward, improvements in the collection and presentation of this data will be possible.

Residential Services Program: Community Engagement and Education Events

Purpose

Understand the reach and demographics of community members attending Residential Services Program (RSP) community engagement and education events.

Approach

This analysis examined the racial and ethnic composition of the RSP community engagement and education services. It also explored the gender identities of community members and their preferred primary languages at home.

Data Source(s)

The community engagement and education dataset was provided by RSP and contained a total of 3,017 entries from Quarters 2 through 4 of the year 2024. This data was collected through either paper surveys or an online survey tool with responses submitted by community members or staff members from community-based organizations (CBOs). For community tabling events, a sign-in sheet was available; however, due to the quick interactions at these events, community members typically stopped at the booth for a few minutes or less and were often reluctant to complete the form.

The demographics evaluation questionnaire was completed at educational workshops by the community members. If completed on paper instead of using the online survey tool, a CBO staff member would scan and email the form to RSP. An RSP staff member would then compile the responses for Haz Waste Program quarterly reporting, but they would not enter the data into the online survey tool. Despite not entering the information online, RSP currently maintains records of all paper forms.

Results and Findings

In 2024, RSP collaborated with community partners on several engagement events, which resulted in a social media reach that exceeded 57,228 unique users who viewed posts across Facebook, Instagram, and TikTok. Furthermore, the data indicated that RSP was primarily engaging BIPOC communities through their outreach and education events. This demonstrated the dedicated commitment of RSP to connect with communities that are underserved by the Haz Waste Program.

- Table 20 presents the racial and ethnic composition of community members in RSP community engagement and education events, both including and excluding the "Unknown" entries. When the "Unknown" category was included, a total of 3,017 entries were recorded. The majority of the community members self-identified as Black or African American (19.69%), followed by Hispanic or Latino/a/x individuals (10.41%). Asian or Asian American participants represented 0.53%, while individuals identifying as White also accounted for 0.53%. The "Other" category

included 0.07%, and those identifying as Two or More Races made up 0.03%. Notably, the "Unknown" category comprised a significant portion, with 68.74% of the total entries, indicating a substantial amount of missing or declined to answer data.

When the "Unknown" category was removed, the total count of entries reduced to 943. In this case, the racial and ethnic percentages shifted dramatically, with Black or African American participants constituting 62.99% and Hispanic or Latino/a/x community members representing 33.30%. The percentages for Asian or Asian American and White individuals increased to 1.70%, while the "Other" and Two or More Races categories increased slightly to 0.21% and 0.11%, respectively.

Table 20. Race and Ethnicity of Community Members at RSP Events (Internal RSP Data, 2024)

Race and Ethnicity	"Unknown" Included		"Unknown" Removed	
	Count	Percent	Count	Percent
Asian or Asian American	16	0.53	16	1.70
Black or African American	594	19.69	594	62.99
Hispanic or Latino/a/x	314	10.41	314	33.30
Other	2	0.07	2	0.21
Two or More Races	1	0.03	1	0.11
White	16	0.53	16	1.70
Unknown*	2,074	68.74	–	–
Total	3,017	100	943	100

** Unknown category was kept because this could indicate decline to answer or missing data.*

- Table 21 illustrates the self-identified gender identities of community members in RSP community engagement and education events, both including and excluding the "Unknown" category. When the "Unknown" category was included, a total of 3,017 entries were recorded. Among these, 19.95% identified as Female, while 8.55% identified as Male. The "Other Identity" category accounted for a small percentage at 0.03%. A significant portion, 71.46%, were in the "Unknown" category, which indicated either a decline to answer or missing data. When the "Unknown" category was removed, the total count of entries decreased to 861. In this scenario, Females represented a substantial 69.92%, and Males accounted for 29.97%. The "Other Identity" category slightly increased to 0.12%.

Table 21. Gender Identity of Community Members at RSP Events (Internal RSP Data, 2024)

Gender Identity	"Unknown" Included		"Unknown" Removed	
	Count	Percent	Count	Percent
Female	602	19.95	602	69.92
Male	258	8.55	258	29.97
Transgender Female	–	–	–	–
Transgender Male	–	–	–	–
Other Identity	1	0.03	1	0.12
Unknown*	2,156	71.46	–	–
Total	3,017	100	861	100

** Unknown category was kept because this could indicate decline to answer or missing data.*

- Table 22 represents the preferred primary languages at home of community members in RSP community engagement and education events, both including and excluding the "Unknown" category. This table does not include data on in-language services and workshops provided by RSP. When the "Unknown" category was included, a total of 3,017 entries were documented. Among these, Amharic was the most reported primary language at 14.75%. Spanish followed with 8.55%, while Tigrinya accounted for 2.65%. Other languages, such as English (1.66%), Oromo (1.03%), and several others, represented smaller percentages with counts ranging from 0.03% to 1.03%. A significant portion, 70.63%, was categorized as "Unknown," indicating a substantial amount of missing or declined to answer data.

  When the "Unknown" category was removed, the total number of entries decreased to 886. In this case, Amharic remained the most reported primary language at 50.23%, and Spanish increased to 29.12%. Tigrinya also showed a notable selection at 9.03%. The percentages for other languages, such as English (5.64%) and Oromo (3.50%), increased as well, reflecting a clearer picture of language preferences at home.

Limitations

- The collection of demographic information at tabling events presented several challenges. Many community members stopped by to observe the available items or information, often quickly moving on to other tables or events. As a result, they frequently lacked the time or willingness to complete the demographic questions, which led to a significant number of missing entries. The dataset reflected 68.74% unknown entries for race and ethnicity, 71.46% for gender identity, and 70.63% for preferred primary language. Feedback from RSP staff members indicated that a considerable portion of these missing entries stemmed from tabling events where interactions were typically brief rather than comprehensive.

- The RSP community engagement dataset would have greatly benefited from adopting the standardized categories established by the Haz Waste Program. Although the categories used were similar, incorporating these standards could have enhanced consistency and comparability across teams and over multiple years, and this would have resulted in more accurate and actionable demographic insights.

Table 22. Preferred Language at Home of Community Members (Internal RSP Data, 2024)

Primary Language	"Unknown" Included		"Unknown" Removed	
	Count	Percent	Count	Percent
Amharic	445	14.75	445	50.23
Chinese	1	0.03	1	0.11
Congolese	1	0.03	1	0.11
English	50	1.66	50	5.64
Guragegna	2	0.07	2	0.23
Hadiya	2	0.07	2	0.23
Hindi	1	0.03	1	0.11
Nepali	1	0.03	1	0.11
Oromo	31	1.03	31	3.50
Punjabi	2	0.07	2	0.23
Sidama	1	0.03	1	0.11
Somali	6	0.20	6	0.68
Spanish	258	8.55	258	29.12
Tigrinya	80	2.65	80	9.03
Ukrainian	4	0.13	4	0.45
Wolayita	1	0.03	1	0.11
Unknown*	2,131	70.63	–	–
Total	3,017	100	886	100

** Unknown category was kept because this could indicate decline to answer or missing data.*

- This analysis was based on data from community engagement and education events provided by one Educator Consultant on the RSP team. Consequently, the results did not reflect the full scope of community engagement activities conducted in 2024. This limitation affected the comprehensiveness of the findings because the analysis overlooked other outreach efforts that could have enhanced the understanding of the impacts of these engagement efforts.

- Furthermore, many community members expressed hesitation in sharing their demographic information at community events due to concerns about anti-immigrant sentiments and federal government enforcement actions, which pose additional challenges in effectively gathering demographic data. While it is important to use demographic data collection forms during workshops and training events, with more time for engagement and collaboration with community members, this approach proved less feasible during tabling at community events.

Residential Services Program: Analysis of Community Events in Highly Impacted Areas

Purpose

Understand the geographic distribution of RSP community events in highly impacted areas.

Approach

This analysis evaluated the geographic distribution of community engagement and education events to determine the extent to which these services reach communities burdened by environmental and socioeconomic risk factors. The event locations were geocoded and mapped alongside data from the EHD mapping tool, which identified census tracts in King County based on their overall EHD index. Census tracts were categorized into quintiles, with Quintile 1 representing the 20% of census tracts least affected by environmental and social risk factors, and Quintile 5 representing the 20% most affected. By comparing the distribution of events across these quintiles, the analysis determined whether community engagement efforts were effectively reaching the areas most impacted by environmental pollution and encountering significant barriers to accessing Haz Waste Program services.

Data Source(s)

The address information for a portion of the community engagement and education events in 2024 was obtained from an Educator Consultant on the RSP team. The EHD mapping data was sourced from the WA DOH website[17] and rescaled to reflect parameters specific to King County.[18]

Results and Findings

The community engagement and education events were predominantly delivered in areas of King County that were most affected by environmental and socioeconomic burdens. Table 23 presents the distribution of these community events by EHD Quintile.

- The majority of the community events (74.2%) were conducted in areas most impacted by environmental health disparities. These events accounted for 69.2% of the unique event locations and engaged 68.6% of total community members. Overall, these results indicated a strong alignment between engagement and outreach efforts and the communities encountering the greatest environmental and socioeconomic challenges.

Limitations

- This analysis was based on data from community engagement and education events provided by one Educator Consultant on the RSP team. Consequently, the results did not reflect the full scope of community engagement activities conducted in 2024. This limitation affected the comprehensiveness of the findings because the analysis overlooked other outreach efforts that could have enhanced the understanding of the impacts of these engagement efforts.

Table 23. Community Engagement Event Locations by EHD Quintile (Internal Data and WA DOH EHD V2 Data Rescaled to King County, 2024)

	Quintile EHD Score	Community Events	% of Events	Event Locations	% of Event Locations	Total Participants	% Participants
1	Census tracts least impacted by environmental health disparities	1	1.5	1	2.6	97	3.2
2		3	4.5	2	5.1	83	2.8
3		1	1.5	1	2.6	120	4
4		9	13.6	7	17.9	592	19.6
5	Census tracts most impacted by environmental health disparities	49	74.2	27	69.2	2,071	68.6
	Virtual Events	3	4.5	1	2.6	54	1.8
	Total	66	100	39	100	3,017	100

Notes: Three community engagement and education events in the dataset were conducted virtually.

Residential Services Program: Lead Investigation Cases

Purpose

Understand the reach and demographics of community members receiving home lead investigations from RSP.

Approach

This analysis examined the racial and ethnic composition of the RSP home lead investigation cases. Additionally, it explored the number of confirmed cases, the countries of origin of the children involved, their age groups, and whether the children had newly arrived in the United States.

A critical aspect of the lead investigation involved Blood Lead Level (BLL) testing. If a child was suspected of having a high BLL, a capillary test, which involved a finger prick, was performed initially at a health facility. Should the results indicate elevated levels, a subsequent venous test, where blood was drawn from a vein, was conducted for confirmation. This step was essential as capillary tests could sometimes yield false positives. RSP only provided assistance after a confirmed case, defined as a venous blood test result of 5.0 µg/dL or greater.

Understanding the number of cases that still required confirmation was important since RSP could not take action without this verification. While RSP actively contacted families to complete the venous testing, the lack of responses often left cases open in the system. This highlighted the need for ongoing communication and support to ensure timely follow-up for affected children.

Data Source(s)

The dataset was obtained from RSP and contained a total of 227 entries with cases originating from the year 2024. The data collection was primarily conducted using X-ray fluorescence (XRF) devices with results entered into an Excel file via a laptop. In instances where a laptop was unavailable, information was recorded on paper. Additional variables were gathered through a questionnaire administered over the telephone prior to a home visit. This information was then entered into an online form known as “Case Manager,” which was created using Microsoft Lists.

Results and Findings

The results indicated that a significant portion of the cases involved children who identified as Middle Eastern or North African, primarily from Afghanistan. Most of these children were between the ages of 0 and 6, and more than half had newly arrived in the United States.

- Table 24 summarizes the racial and ethnic composition of the children involved in lead investigations. In the initial dataset, the category of "Unknown" race and ethnicity was included to account for instances where individuals either declined to provide their information or where data entry was incomplete. This category comprised 24 cases, which represented 10.57% of the total dataset of 227. Keeping the "Unknown" designation was important for maintaining the integrity of the data as it highlighted potential gaps in information that could influence analysis and understanding of the community members served.

  Notably, the highest representation was among children identifying as Middle Eastern or North African who accounted for 42.73% of the total, and all of whom were from Afghanistan. Other children who received assistance for lead investigations included Asian or Asian American (11.89%), Black or African American (18.50%), Hispanic or Latino/a/x (8.37%), Native Hawaiian or Pacific Islander (0.88%), and White (7.05%). It is also important to note that families identifying as Black or African American had recently resettled in Washington State, and none were US native-born.

  Upon removing the "Unknown" category, the total number of cases in the dataset was adjusted to 203. Without the "Unknown" entries, the percentages for each group reflected a more precise distribution of identified races and ethnicities. For example, the percentage of children identified as Middle Eastern or North African increased from 42.73% to 47.78%. Additionally, the representation of Asian or Asian American children increased from 11.89% to 13.30%, while cases with Black or African American children increased from 18.50% to 20.69%. Hispanic or Latino/a/x individuals saw a similar rise from 8.37% to 9.36%. The percentages for Native Hawaiian or Pacific Islander and White children were 0.99% and 7.88%, respectively.

- The results for the age group indicated that a significant majority of the children involved were within the 0-6 age range, comprising 78.85%. The 7-17 age group represented 20.70% with 47 children. Additionally, there was one entry categorized as "Unknown." These results highlighted that the majority of cases were concentrated in the younger age group, which emphasized the need for prioritized engagement for this vulnerable population (Table 25).

Table 24. Race and Ethnicity of Lead Investigation Cases for Children (Internal RSP Data, Q1–Q3 2024)

Race and Ethnicity	"Unknown" Included		"Unknown" Removed	
	Count	Percent	Count	Percent
Asian or Asian American	27	11.89	27	13.30
Black or African American*	42	18.50	42	20.69
Hispanic or Latino/a/x	19	8.37	19	9.36
Middle Eastern or North African**	97	42.73	97	47.78
Native Hawaiian or Pacific Islander	2	0.88	2	0.99
Unknown***	24	10.57	–	–
White	16	7.05	16	7.88
Total	227	100	203	100

** Families identifying as Black or African American had recently resettled in Washington State, and none were US native-born.*

*** The highest race and ethnicity represented for the lead investigation was Middle Eastern or North African. However, all interactions recorded were with individuals from Afghanistan.*

**** Unknown category was kept because this could indicate decline to answer or missing data entry.*

Table 25. Age Group of Lead Investigation Cases for Children (Internal RSP Data, Q1–Q3 2024)

Age Group	Count	Percent
0-6	179	78.85
7-17	47	20.70
Unknown	1	0.44
Total	227	100

- The summary of case confirmation revealed that a majority of the cases, 171 out of 227, had been confirmed (75.33%). In contrast, 56 cases or 24.67%, remained unconfirmed. These results highlighted the strong confirmation rate among the cases reviewed, while also emphasizing the need for ongoing efforts to verify unconfirmed cases and provide necessary support, thereby ensuring that appropriate actions were taken for affected children (Table 26).

Table 26. Case Confirmed of Lead Investigation Cases (Internal RSP Data, Q1–Q3 2024)

Case Confirmed	Count	Percent
Not Confirmed	56	24.67
Confirmed	171	75.33
Total	227	100

- The analysis of the newly arrived status of the children indicated that a slight majority, 118 out of 227 (51.98%), were classified as newly arrived. In contrast, 106 children representing 46.70%, were classified as not newly arrived in the United States. Additionally, there were three entries categorized as "Unknown" accounting for 1.32%, which reflected instances where the information was either declined or not recorded. This distribution indicated the significant presence of newly arrived children emphasizing the need for prioritized support and resources for this population as they adjust to their new environment in a different country (Table 27).

Table 27. Newly Arrived Children of Lead Investigation Cases (Internal RSP Data, Q1–Q3 2024)

Newly Arrived	Count	Percent
Yes	118	51.98
No	106	46.70
Unknown	3	1.32
Total	227	100

- The examination of the children's country of origin revealed that Afghanistan was the most represented nation, accounting for 44.05% of the total dataset. Other notable countries included Angola, with 9 cases (3.96%), and India with 6 cases (2.64%). Additional countries represented in smaller numbers included Ethiopia (2 cases), Haiti (2 cases), and several others with just 1 case each, such as Benin, Chad, China, and El Salvador. The "Unknown" category impacted the results, comprising 92 entries or 40.53%.

  When excluding the "Unknown" category, Afghanistan remained the prevailing country, representing 74.07% of the total. Other countries cases included Angola (6.67%) and India (4.44%). The remaining countries contributed fewer cases with Ethiopia and Haiti each contributing 2 cases, while several others, such as Benin, Chad, and El Salvador, each accounted for just 1 case (Table 28).

Table 28. Country of Origin of Lead Investigation Cases for Children (Internal RSP Data, Q1–Q3 2024)

Country of Origin	"Unknown" Included		"Unknown" Removed	
	Count	Percent	Count	Percent
Afghanistan	100	44.05	100	74.07
Angola	9	3.96	9	6.67
Benin	1	0.44	1	0.74
Chad	1	0.44	1	0.74
China	1	0.44	1	0.74
Congo	1	0.44	1	0.74
El Salvador	1	0.44	1	0.74
Ethiopia	2	0.88	2	1.48
Ghana	1	0.44	1	0.74
Guatemala	1	0.44	1	0.74
Haiti	2	0.88	2	1.48
India	6	2.64	6	4.44
Kenya	1	0.44	1	0.74
Marshallese	1	0.44	1	0.74
Myanmar	1	0.44	1	0.74
Somalia	2	0.88	2	1.48
Venezuela	3	1.32	3	2.22
West Africa	1	0.44	1	0.74
Unknown	92	40.53	–	–
Total	227	100	135	100

Limitations

- The analysis encountered delays due to data entry errors, which necessitated recoding and correcting various categories. To mitigate similar issues in the future, it is advisable to eliminate manual data entry into Excel. Instead, using online data collection software that facilitates simple checkbox responses would have enhance the efficiency of the process and allowed for automatic population of data into Excel.

- The Country of Origin variable had approximately 41% of the data missing, highlighting a significant gap in the information collected. The missing information can hinder decision-making and limit the understanding of the community members being served by the Haz Waste Program.

- In terms of the age variable, there were currently two age ranges identified. However, considering the specific population being served, it may be more effective to present this information as distinct ages rather than grouped categories. While the preferred standard is to report age ranges according to the established standards of the Haz Waste Program, the small variability within this age group suggested that listing individual ages could provide clearer insights.

Communications: Haz Waste Program Haz Line

Purpose

Understand the engagement, reach, and demographics of customers using the Haz Waste Program Haz Line (Haz Line) managed by the Communications team.

Approach

This study examined the racial and ethnic composition of callers to the Haz Line, which is a call center managed by the Communications team that connects individuals with experts who provide guidance on product disposal, safer alternatives, and natural yard care. Additionally, the analysis explored the reasons for customer inquiries, as well as the gender identity and age range of the callers.

Data Source(s)

The dataset provided by the Communications team included caller information collected by Haz Line operators who recorded a total of 203 callers between August and October 2024. For approximately two years, the Communications team has been in contract with Tilth Alliance to operate the Haz Line. The collected data specifically focused on calls related to hazardous waste services and excluded those associated with natural yard care, since data was not ascertained for those calls.

Upon initiating a call, a survey is administered, and the operator uses a script developed by the Communications team. The operators are supposed to verify the caller's ZIP code to ensure they are residents of King County; otherwise, the caller is directed to their respective county's hazardous waste management department for assistance. The information collected from callers is manually entered into Extranet, and this system captures data in an open-ended format. The operators are required to ask the relevant questions and input the responses directly into the note box in Extranet.

When callers contact the Haz Line, if an operator is available to accept their call, the caller is automatically connected to the operator rather than being directed to an automated system with pre-recorded messages. The callers may encounter an automated message if the operators are busy with other callers, if operators are unavailable due to meetings, or if the call is made outside of operational hours. The caller is given the option to stay in the phone queue until the operator can accept their call, or they can select to leave a voicemail, and a Tilth Alliance staff member will return the call at the earliest opportunity. Staff members who manage the Haz Line will also use different automated message recordings over the course of the year to promote Wastemobile services and events.

Results and Findings

The majority of callers to the Haz Line identified as White and male with a significant number of them being 55 years old or older. These callers primarily sought information regarding the disposal of hazardous waste, household waste, and paint.

- Table 29 presents the race and ethnicity information of callers who contacted the Haz Line during the three-month period. The response rate for the race and ethnicity question was 100%, and callers identifying as White (64.04%) contacted the Haz Line at a higher rate compared to the overall population of White residents in King County. This was followed by Asian or Asian American callers who made up 9.36% of the total. An "Other" category was created, accounting for 13.79% of responses, to accommodate answers that were either vague or did not fit into predefined categories. The additional race and ethnicity identities for the callers included Black or African American (1.97%), Hispanic or Latino/a/x (3.94%), Two or More Races (4.43%), American Indian or Alaska Native (0.99%), Native Hawaiian or Pacific Islander (0.99%), and Middle Eastern or North African (0.49%).

- Table 29 also presents summary statistics excluding the “Other” category. The "Other" category primarily consisted of individuals who identified as European or European American (24 out of 28), with the other four identifying as “Human” (2 respondents), “not white, not black” (1 respondent) and “other” (1 respondent). Data is additionally presented without the "Other" category to ensure a more meaningful analysis without making incorrect assumptions regarding individuals’ race and ethnicity.

- Since we cannot be certain which race or ethnicity category respondents reporting things like “European” or “Human” truly belong to, including such a sizable and heterogeneous category could potentially skew the results and interpretations. This could lead to misinterpretations or overgeneralizations about the data and groups represented by artificially reducing proportions of other race or ethnicity categories—including, importantly, the proportion of residents who identify as White. By removing this category, the analysis facilitates a more accurate representation and understanding of potential disparities.

- The results excluding the “Other” category indicated that a significant majority of callers identified as White, comprising 74.29% of the sample. Asian or Asian American callers accounted for 10.86%, while those identifying as Hispanic or Latino/a/x represented 4.57%. Black or African American callers made up 2.29% with those identifying as Two or More Races comprising 5.14%. Smaller percentages were noted for American Indian or Alaska Native (1.14%), Native Hawaiian or Pacific Islander (1.14%), and Middle Eastern or North African (0.57%) callers.

Table 29. Race and Ethnicity of Haz Line Callers (Internal Data, Q3 2024)

Race and Ethnicity	"Other" Included		"Other" Removed	
	Caller	Percent	Caller	Percent
American Indian or Alaska Native	2	0.99	2	1.14
Asian or Asian American	19	9.36	19	10.86
Black or African American	4	1.97	4	2.29
Hispanic or Latino/a/x	8	3.94	8	4.57
Middle Eastern or North African	1	0.49	1	0.57
Native Hawaiian or Pacific Islander	2	0.99	2	1.14
Other*	28	13.79	–	–
Two or More Races	9	4.43	9	5.14
White	130	64.04	130	74.29
Total	203	100	175	100

** Note: The "Other" category included individuals identifying as European (24/28) with 2 identifying as Human and 2 providing other responses. The study refrained from recategorizing these responses to avoid assumptions. To enhance clarity, data are presented with and without the "Other" category.*

- This age variable was modified to age ranges for easier analysis and used categories that were used in other Haz Waste Program studies (Table 30). The "Retired" and "Old" categories were retained as provided by the customers to account for responses that did not fit into the predefined categories. The largest portion of callers was in the "66 or older" category, which represented 38.42% of the total. This was followed by the "55-65" age range, which comprised of 27.09% of the callers. The age ranges also included "45-54" at 12.81%, "35-44" at 11.33%, "25-34" at 8.37%, and "18-24" at 0.99%. Additionally, there were unique entries labeled as "Retired" and "Old" each contributing 0.49% to the total.

Table 30. Age Range of Haz Line Callers (Internal Data, Q3 2024)

Age Range	Caller	Percent
18-24	2	0.99
25-34	17	8.37
35-44	23	11.33
45-54	26	12.81
55-65	55	27.09
66 or older	78	38.42
Retired	1	0.49
Old	1	0.49
Total	203	100

- The majority of the callers identified as Male which comprised of 62.07%. Female callers accounted for 37.44% of the total (Table 31). There was one entry categorized as a Missing Entry because it initially contained both "male and female" as the response. This entry was removed since there was no way to accurately determine whether the caller identified as male or female from the available data entries.

Table 31. Gender Identity of Haz Line Callers (Internal Data, Q3 2024)

Gender Identity	Caller	Percent
Missing Entry	1	0.49
Female	76	37.44
Male	126	62.07
Total	203	100

- Table 32 illustrates that the callers contacted the Haz Line for various reasons, and the most significant category identified was "Hazardous Waste Disposal," representing 37.93% (77 entries) of the responses. Other notable issues included "Household Items Disposal" at 16.75% and "Paint" at 15.76%. General inquiries represented 7.88% (16 entries), while categories like "Battery," "Electronics Disposal," and "Light Bulbs or Fluorescent Tubes" each made up a smaller portion. The results highlight a prevalent concern regarding hazardous waste and a diverse range of inquiries related to disposal options.

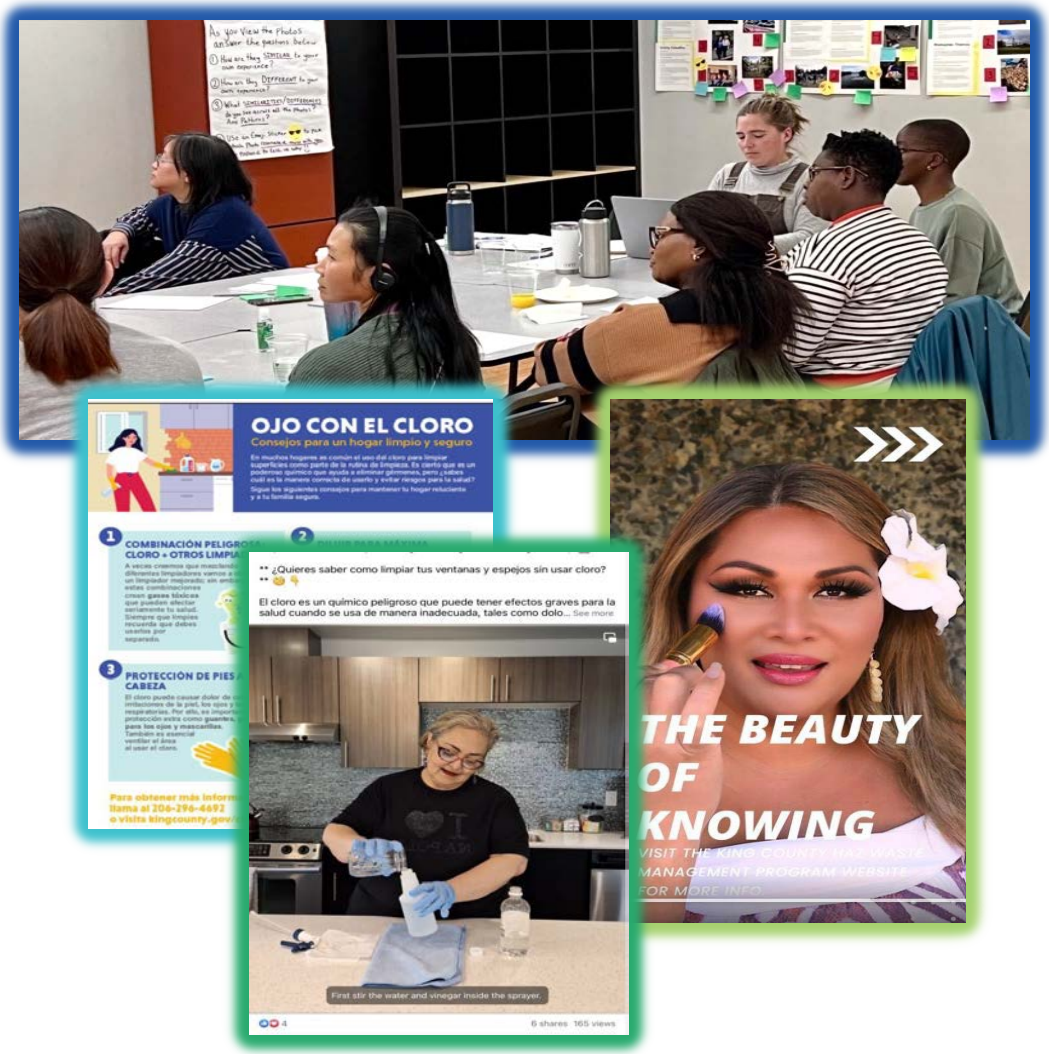
Table 32. Caller Inquiries to the Haz Line (Internal Data, Q3 2024)

Issue Description	Caller	Percent
Blank Entries	9	4.43
Battery	6	2.96
Electronics Disposal	6	2.96
General Inquiries	16	7.88
Hazardous Waste Disposal	77	37.93
Household Items Disposal	34	16.75
Light Bulbs or Fluorescent Tubes	5	2.46
Metals	3	1.48
Paint	32	15.76
Sharp Items	2	0.99
Two or More Questions	13	6.40
Total	203	100

Limitations

- The information collected from callers was manually entered into Extranet, which captured data in an open-ended format. The Haz Line operators were required to ask relevant questions and input the responses directly into the notes section of Extranet. This method had resulted in a wide variety of answers and sometimes made data cleaning and analysis challenging. In the future, it may be more beneficial to use different data collection software that offers predefined categories for operators to select from, thereby streamlining the data collection process and enhancing the clarity of callers' responses. For instance, instead of allowing an open-ended response for the variable indicating the reason callers contacted the Haz Line, specific categories should be provided.

- Additionally, questions regarding gender identity, race and ethnicity, age, and preferred language format should align with the standards established by the Haz Waste Program. Incorporating these standards as data categories would improve consistency and comparability in data collection efforts. For example, rather than entering individual ages, operators could select from established age ranges.
- The Communications team should consider implementing a similar data collection process for callers seeking guidance on natural yard care. This will offer a clearer understanding of the individuals who contact the Haz Line, rather than solely capturing data from callers inquiring about hazardous waste services.



Trends and Discussion

The effort involved in collecting and analyzing the data represents a significant step toward self-reflection for the Haz Waste Program. This analysis constitutes a substantial endeavor that positions the Haz Waste Program to better identify areas where it can allocate additional resources and time to understand environmental service disparities within the community. The findings demonstrate the need for strategic adjustments to enhance accessibility and engagement efforts. By addressing systemic barriers and ensuring equitable distribution of services, the Haz Waste Program can continue to improve on its commitment to environmental justice and community health.

The Service Equity Analysis provides insights into the alignment of Haz Waste Program service delivery with the demographics of King County. The study of survey data, geographic locations, and community engagement metrics highlights disparities in service access and usage among racial, ethnic, and socioeconomically marginalized groups. BIPOC communities, low-income residents, and non-English-speaking households who often reside in areas with greater environmental health disparities were consistently underrepresented among service users. For instance, individuals who identify as White represent a disproportionate share of customers across various services even in regions with a high concentration of BIPOC populations.

Geospatial analyses illustrate the misalignment between service locations and areas most affected by environmental and socioeconomic challenges even though technical assistance visits for businesses, community engagement, and education initiatives prioritize highly impacted areas. Broadly, this analysis reveals that the largest disparities in access occur in areas of Haz Waste Program operations where customers must actively seek out services and resources. The evidence compiled indicates that customers using these services—such as collection, disposal, and the Haz Line call center—tend to be disproportionately White, affluent, and English-speaking compared to the overall King County population.

In contrast, when the Haz Waste Program delivers services directly to the community—through organizing community engagement events, educational workshops, or providing technical assistance to SQGs—the analyses suggest that services are distributed in a more equitable manner with greater participation from BIPOC, low-income, and non-English-speaking community members. This report highlights both gaps in service equity and areas where service delivery aligns well with equity goals by reinforcing the need for proactive outreach to ensure all communities have equitable access to Haz Waste Program services.

Limitations of the Service Equity Analysis

In addition to the limitations stated within each analysis section, this study encountered several overarching limitations due to variability in data collection methods, gaps in demographic information, and a lack of data on barriers to accessing Haz Waste Program services. A key methodological challenge was the inconsistency in data collection methods, particularly with survey data, which complicated the comparability of analyses across data sources and hindered the assessment of service equity. These inconsistencies resulted from differences in who collected the data (Haz Waste Program staff, CBOs, or contracted service provider), variations in the data collection timeframes, differences in demographic categories, and variability in the processes used for data collection. These discrepancies made it difficult to establish a clear perspective of how effectively services reached the diverse populations of King County.

The dearth of data in certain areas, stemming from the absence of a unified standard in data collection practices, further complicated a holistic analysis of Haz Waste Program services. While this report incorporated the most recent and relevant data sources available, in many cases, the only data available for evaluating specific services came from surveys with modest sample sizes and limited scope. Additionally, the current lack of baseline or historical data limited the ability to assess trends over time. In other instances, such as city and tribal collection services, no customer demographic data was accessible. These data gaps impeded efforts to maintain consistency and comparability across multiple years and service areas. Therefore, establishing consistent best practices for data collection is essential for facilitating more effective evaluations that will guide improvements in services.

Furthermore, the available data primarily captured demographic information and lacked insight into barriers and motivators related to service use and knowledge of the resources provided by the Haz Waste Program. While this analysis identified disparities in service use and delivery, it did not fully explain the underlying reasons for these disparities, such as potential obstacles related to transportation, awareness, or cultural preferences. These limitations specifically hindered the ability to address one of the initial research questions: How effectively are services being implemented to ensure equitable access across diverse communities?

Opportunities for Improvement and Next Steps

The Service Equity Analysis represents a significant step toward understanding the effectiveness and impact of the Haz Waste Program services across communities in King County. It is essential to maintain the Service Equity Analysis and continue the assessment regularly to further explore service dynamics in this context and to implement strategic, evidence-based processes to improve events and initiatives. This analysis aims to provide the Haz Waste Program with actionable insights for making services more equitable.

The Service Equity Analysis reveals notable disparities in specific service areas. This analysis not only identifies opportunities for improvement but also offers strategies informed by prior community-centric research conducted by the Haz Waste Program.[19] In addition to earlier studies, the Haz Waste Program has conducted a multiyear research initiative since 2022, which includes the Market Research Project and a community-led photovoice engagement project. These efforts intend to enhance services in King County, explore health and environmental connections from the perspectives of community members, and improve overall service delivery. The focus has been on effectively engaging historically underserved populations, including BIPOC, resource-limited individuals, and younger community members.

These studies have provided valuable insights as community members offered important opportunities for improvement and suggestions for the services they would like to see implemented. These studies uncovered common themes and requests from community members regarding how to enhance services and outreach. The findings of this analysis confirm and align with the opportunities for improvement expressed by community members. Opportunities for improvement and next steps that could help us achieve this goal are listed below:

Standardized Data Collection: Future data collection efforts by staff members should adhere to standardized protocols to ensure the reliability and validity of the data collected across different contexts. This includes using consistent terminology for race, ethnicity, and other demographic categories. The LOBs should implement online data collection software to streamline this process and reduce data entry errors. Additionally, conducting focused data collection events within a similar timeframe and scale will improve the consistency and comparability of the data across the Haz Waste Program.

Methods to Evaluate Service Equity: This study primarily leverages quantitative data, and future analyses should consider alternative methods to track and evaluate service equity outcomes more comprehensively. Exploring various approaches, including culturally appropriate methodologies and qualitative methods such as interviews and focus groups, can provide a nuanced understanding of how services impact different communities. Implementing surveys that assess user satisfaction and identify perceived barriers and motivators can yield valuable insights into the effectiveness of engagement efforts or improvements to service deliveries. By implementing a mixed-methods approach, the Haz Waste Program can better understand the multifaceted nature of service delivery and determine specific areas for improvement.

Focus on Highly Impacted Communities: Prioritizing service delivery in highly impacted communities is crucial for addressing systemic inequities and ensuring access to necessary resources for underserved communities. Even though focusing on these communities is currently a goal of the Haz Waste Program, the Service Equity Analysis has revealed additional opportunities for improvement in how communities are prioritized.

To address these disparities and enhance equitable access to services, the Haz Waste Program should leverage available data resources and tools that are not fully used by its various Lines of Business. This will enable more informed decision-making and outreach. By making a concerted effort to engage with these communities, the Haz Waste Program can improve accessibility to services and reinforce its commitment to environmental justice and equity.

Maintain and Build Partnerships with CBOs: Establishing meaningful and equitable partnerships with CBOs that work closely with King County priority populations is crucial for enhancing the effectiveness and impact of Haz Waste Program services. Rather than simply increasing the number of CBOs collaborating with the Haz Waste Program through single engagement initiatives, the focus should be on enhancing the quality and sustainability of these partnerships. This approach aligns with the principles of CBPR, which emphasizes long-term relationships built on trust and mutual learning. Investing resources and time in these relationships is essential because meaningful collaboration is a gradual process that requires a significant commitment. By deepening connections with trusted CBOs, the Haz Waste Program can raise awareness of available resources, improve communication channels, and better address the needs of these communities.

These organizations have insights into the unique needs, challenges, and cultural contexts of the communities they serve. By leveraging their expertise, the Haz Waste Program can develop more customized engagement strategies that resonate with different communities. When residents see familiar organizations advocating for their needs, they are more likely to engage with the Haz Waste Program. This collaboration can help identify barriers to service access and develop culturally appropriate and effective solutions. Furthermore, working with CBOs enables the Haz Waste Program to expand outreach efforts and strengthen service delivery because these organizations often have established networks and communication channels within the community. The Communications team, Research Services team, and RSP have already successfully collaborated with multiple CBOs using CBPR principles to establish strong partnerships across various research, educational workshops, and community engagement initiatives.

Invest More in Wastemobile Services: Investing more resources into mobile waste collection efforts can alleviate barriers to accessing hazardous waste disposal services. Increasing investment in Wastemobile services is fundamental for reducing obstacles that prevent residents from accessing fixed collection facilities, which may be inconvenient for them. Wastemobile services can reach geographically isolated communities or those facing transportation challenges, providing residents with easy access to essential services.

By strategically deploying mobile collection services in locations such as multifamily properties, parks, or community centers, the Haz Waste Program can minimize the need for community members to find transportation options to get to Wastemobile events, ensuring that they can easily dispose of hazardous waste without added burdens. Scheduling these services during peak demand times in areas with high concentrations of underserved populations will improve service usage and overall effectiveness. Notably, the Wastemobile customer population aligns slightly more with the overall racial demographics of King County, which suggests a promising strategy to enhance access for BIPOC residents. The racial and ethnic composition of Wastemobile users indicates that this service is more effective in reaching diverse communities compared to fixed facilities.

Explore Implementing Curbside Services: To increase convenience for residents and improve access to hazardous waste disposal, the Haz Waste Program should explore the feasibility of curbside pickup services. Many residents may encounter challenges traveling to hazardous waste collection facilities due to transportation limitations, mobility issues, or time constraints. Offering curbside services can significantly reduce these barriers and make it easier for residents to dispose of hazardous waste properly. This approach not only increases participation rates but also ensures that hazardous waste is managed safely and responsibly. By implementing curbside services, the Haz Waste Program can reach more customers across King County, fostering greater community engagement and contributing to improved public health and environmental outcomes. This proactive measure aligns with the commitment of the Haz Waste Program to improve equity and accessibility in service delivery.

In-Language, In-Culture, and Disability Data: Tracking language access, cultural services, and disability data is essential for understanding and improving service delivery to the communities. By systematically collecting information in these areas, the Haz Waste Program can identify potential barriers to access and ensure that services are inclusive and fostering increased participation and community engagement. This approach demonstrates a commitment to serving all community members and helps to establish trust within the communities.

In-Language, In-Culture, and Disability Awareness Training for Staff Members: In addition to tracking language access, cultural services, and disability data, it is essential to implement standardized training for staff members on these topics. The trainings will prepare Haz Waste Program staff members with the knowledge and skills needed to engage effectively with diverse populations and address their unique needs. The curriculum should cover best practices for communication, including the use of interpreters, material translation, disability awareness and etiquette, and culturally sensitive approaches to service delivery. The trainings will improve community interactions and ensure that all staff members understand the importance of creating an inclusive environment for all.

Endnotes

[1] See the 2021 Hazardous Waste Management Plan and the 2018 Racial Equity Strategic Plan.

[2] See King County Determinants of Equity data tool and King County Communities Count data for more information.

[3] See Appendix F of the Hazardous Waste Management Plan

[4] The term "highly impacted" refers to communities that are potentially the most affected by Environmental injustices and other cumulative social and economic impacts, as outlined in the Washington State Environmental Justice Task Force's Fall 2020 report titled *Recommendations for Prioritizing EJ in Washington State Government*.

[5] S1601: Language Spoken at Home

[6] S1901: Income in the Past 12 Months

[7] See 2024 Wastemobile Schedule–King County, Washington

[8] See Washington Environmental Health Disparities Map | Washington State Department of Health

[9] This analysis uses a modified version of the EHD data, which has been rescaled from the entire Washington State to calculate disparities specifically within King County census tracts. For more information, see the Haz Waste Program technical report, publication LHWMP_0358: Min, E., Peckham, T., and Fellows, K. (2021). *Developing a King County Environmental Health Disparities Map*. Hazardous Waste Management Program in King County.

[10] It should be noted that contracted entities are responsible for organizing these events and determining the specific locations for hazardous waste collection sites.

[11] Refer to Endnote 8.

[12] Refer to Endnote 9.

[13] Small Quantity Generators (SQGs) are businesses in Washington State that produce less than 220 pounds of hazardous waste or less than 2.2 pounds of specific highly toxic waste monthly. The regulations that govern this category of hazardous waste generators are simpler than those for medium or large quantity generators.

[14] Refer to Endnote 8.

[15] Refer to Endnote 9.

[16] Refer to Endnote 8.

[17] Refer to Endnote 8.

[18] Refer to Endnote 9.

[19] Refer to Endnote 3.