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Toronto Public Health
Evaluation Methodology

Health Assessment of the Options under Consideration for the City of Toronto's Waste Strategy

Background

In 2014, the City of Toronto's (the City) Solid Waste Management Services (SWMS) initiated the development of a Long Term Waste Management Strategy for Toronto, which will guide the City's waste management decision making for the next 30 to 50 years.

In October 2015, City Council approved the final vision, guiding principles and evaluation criteria for the Long Term Waste Management Strategy (Waste Strategy). At this meeting, City Council adopted, among other items, that "Estimated Health Care Costs" be added to the Cost section of the evaluation criteria. The City Council Decision document can be viewed at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.PW7.3>

Solid Waste Management Services' evaluation criteria uses a triple bottom line approach to assess the list of options, based on environmental, social and economic factors. Toronto Public Health (TPH) was asked by SWMS in October 2015 to complement this approach by leading the evaluation of public health impacts and health care costs for the 43 waste management options by applying a public health lens to each option.

In order to complete an assessment of the 43 options within the short time available to meet the deadline to present a draft strategy at the February 29th, 2016, Public Works and Infrastructure Committee meeting, TPH conducted a public health analysis of the options using a rapid Health Impact Assessment (HIA).

Role of Rapid HIA in Supporting Decision-Making in a Healthy City

The way cities are built shapes the lives and the health of the people who live in them (*Healthy Toronto by Design*: TPH, 2011)

<http://www.toronto.ca/legdocs/mmis/2011/hl/bgrd/backgroundfile-41333.pdf>

A Health Impact Assessment (HIA) is a combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population (World Health Organization, 1999). A rapid HIA is a desktop exercise, utilizing existing information, often complemented by input from experts with specific knowledge of the topic or program. In contrast, in-depth HIAs involve the collection and/or generation of site-specific data on a project; the community where the project is situated; and, the perspectives of stakeholders.

TPH developed an HIA framework and screening tool (TPH HIA Framework) in 2008 to provide a consistent framework for the health assessment of municipal projects and policies. The TPH HIA Framework can be used to guide a rapid or an in-depth HIA assessment. This framework was used to examine the options being assessed as part of the Waste Strategy.

Toronto Public Health's Role to Support the Assessment of the Waste Strategy: Rapid HIA Methodology

Overview of Methodology

TPH conducted an analysis of the waste management options using a rapid HIA. The objective of the rapid HIA was to evaluate the options from a public health and equity perspective, and specifically, to provide an assessment for each option for the following two indicators:

1. Potential to Impact Human Health (potential to have an adverse or beneficial impact).
2. Potential to Increase Health Care Costs.

The results of the rapid HIA process were then integrated into the assessment of the options being considered for the Waste Strategy.

Rapid HIA Methodology: Step-by-Step Process

Step 1: Screen out options that cannot be assessed using the triple bottom line approach

At the start of the process, the Waste Strategy project team conducted a preliminary screen of all of the options to select those that could be assessed using the triple bottom line methodology. This step was conducted in advance of the rapid HIA and reduced the number of options for further assessment from 72 to 43. Twenty-four Implementation Tools and five options related to Future Considerations were screened out from the triple bottom line assessment because they have no direct environmental, social, or economic impact. For instance, expanding social media presence or implementation requirements for Blue Bin processing capacity in 10 years' time do not have an environmental, social, economic or public health impact. These options may have an indirect impact on public health through promotion of programming for waste diversion; however, the impacts were deemed to be too indirect to warrant inclusion in the assessment. Attachment 2 of the SWMS Staff Report lists the options included in the Implementation Tools and Future Considerations groupings that were screened out of the assessment.

Step 2: Evaluate each option through a multiple determinant of health lens

Each screened-in option was considered through a multiple determinant of health lens using the TPH HIA Framework. The framework tool identifies a range of factors to be considered during an HIA. These are grouped into five major categories of determinants of health:

1. Environmental Factors (for example, air quality, odour, water quality, soil quality, noise);
2. Social and Economic Factors (for example, employment opportunities, income, education, crime, housing);
3. Lifestyle Factors (for example, physical activity, diet, smoking, alcohol, drug use);
4. Access to Services (for example, health services, transportation, leisure, solid waste services); and,
5. Potential for Unequal Impacts – Equity Dimension (for example, age, sex, socio-economic status).

Expert judgement was used to determine how each option affects these determinants of health. This included assessing the direction of the impact (positive, negative, both, neutral, not enough information or not applicable) as well as estimating the magnitude of the impact on public health.

Step 3: Sum the indicator scores for the health determinants to assign a Health Impact Score

The results of each health determinant were summed and the total score recorded. Negative scores indicate a potential for an adverse impact on public health. Scores in the range of zero to four were considered neutral (minimal to no potential for beneficial impact on public health) and scores higher than five indicate the potential for a beneficial impact on public health. The final scores ranged from -19 to +10.

These categories were then translated into scores for use in the Waste Strategy evaluation as follows: Potential for positive impacts = 3, Neutral impacts = 2, and Potential for Negative impacts = 1.

Step 4: Evaluate Each Option for Potential to Increase Health Care Costs

Each option was then assessed for its potential to increase health care costs. Health care costs are defined as costs to the health care sector specifically (for example, emergency room visits and hospital admissions) as well as costs borne by families, individuals and communities to address suboptimal health and well-being (for example, loss or reduction in income due to missed or reduced scope of work, physiotherapy, or mental health support).

A score of Low, Medium and High for health care cost implications are defined as the following:

- Low: Unlikely to result in increased health costs and some potential for reduction in health costs.
- Medium: Uncertain although unlikely that the option will result in increased health care costs.
- High: Potential to result in increased health care costs.

These categories were then translated into scores for use in the Waste Strategy evaluation as follows: Low = 3, Medium = 2 and High = 1.

In general, there was not enough information available to conduct a quantitative economic analysis of the potential health care costs. Expert judgement was used to evaluate the options in terms of potential to impact health care costs using the Low, Medium and High criteria.

Step 5: Convene an Expert Workshop to Review the Methodology and Preliminary Results

TPH convened an expert workshop to discuss the methodology, ranking, and scoring of options from a health perspective.

Ten experts participated in the workshop. The experts have interdisciplinary knowledge and expertise in:

- Public health (3 experts);
- Health Impact Assessments (2 experts);
- Solid waste management (2 experts);
- Economics (1 expert); and,
- Epidemiology, toxicology and risk assessment (2 experts).

Many of the experts have expertise in multiple relevant areas. Three additional solid waste management experts participated in the workshop as content experts to provide clarification on the options.

Findings

Forty-three options were assessed for their potential to impact public health and health care costs. Table 2 provides a summary of the Health Impact score for each of the options, organized by waste management categories and listed from highest score (potential beneficial impacts) to lowest score (potential adverse impacts).

Potential Public Health Impact

Seven of the 43 options were assessed to have a potential for positive impacts on public health (as defined as Health Impact scores of greater than five). These options are primarily in the Waste Reduction and Reuse and Multi-residential categories. Two options of particular interest from a public health perspective are the Food Waste Reduction Strategy option (Health Impact score, +10) and the Community/Mid-scale Composting option (Health Impact score, +5). These options provide opportunities to influence Toronto's food system and are directly aligned with several key strategic City initiatives including: TO Prosperity: Toronto Poverty Reduction Strategy; GrowTO: An Urban Agriculture Action Plan; and the Toronto Food Strategy.

Seventeen of the 43 options were assessed to have a potential for adverse impacts on public health (negative Health Impact score). In general, these options fall into two categories: Recovery – New Facilities and the Residual Waste categories. These options are significant capital infrastructure projects (for example, landfill options, direct combustion, waste-to-fuel options, waste transfer stations) or options that eliminate a significant City service (for example, elimination of collection service to multi-residential buildings). Significant infrastructure projects require extensive regulatory approval processes due to their potential to impact the environment and health. The landfill and direct combustion options had the highest adverse health impacts (Health Impact scores ranged from -15 to -19).

Nineteen of the 43 options were assessed as neutral from the perspective of potential impacts on public health (Health Impact score between 0 and 4). These options were found to have minimal to no potential for impacts on public health (beneficial or adverse). These options ranged from use of economic incentives and deterrents, innovative approaches to encourage increased drop-off of recyclables, and changes to existing SWMS operations.

Potential to Increase Health Care Costs

For the majority of options (26), the potential health care cost implications are predicted to be Low, essentially unlikely to result in increased health costs and some potential for reduction in health costs. For 17 of the options, the impacts are predicted to be Medium, uncertain, although unlikely to result in increased health care costs. Based on the available information, none of the options were identified with the strong potential to increase health care costs (score of High). Options that have the potential to increase health costs are unlikely as provincial and federal regulations are in place to safe guard against the approval of projects that result in harm to public and worker health.

Table 2: Results of the Rapid HIA – Health Impact Score and Potential to Increase Health Care Costs

Option Number ¹	Indicator	Health Impact Score ²	Potential to Increase Health Care Costs
Waste Reduction and Reuse			
Option 2.2	Food Waste Reduction Strategy	10	Low
Option 2.6	Explore Opportunities for Waste Exchange	5	Low
Option 2.3	Textile Collection and Reuse Strategy	5	Low
Option 2.4	Sharing Library	5	Low
Option 2.5	Support Reuse Events	2	Low
Multi-Residential			
Option 3.2b	Alternative Collection Methods for Multi-Residential Buildings – Vacuum system	8	Low
Option 3.2a	Alternative Collection Methods for Multi-Residential Buildings - One container system	7	Low
Option 2.7	Community/Mid-Scale Composting	5	Low
Option 5.1	On-site Organics Processing	3	Low
Option 5.2	In-Sink Disposal Units	3	Low
Option 1.9	Updates to Current Multi-Residential Development Standards	1	Low
Option 1.8	Mandatory Multi-Residential By-law	1	Low
Option 3.1	Container management	1	Low
Option 3.7	Multi-Residential Collection using Alternative Vehicles	1	Low
Option 9.1	Elimination of Collection Service to Multi-Residential Buildings	-9	Medium
Drop-Off Facilities			
Option 3.4	Develop a Network of Permanent, Small Scale Neighbourhood Diversion Stations in Convenient Locations	4	Low
Option 3.5	Develop a Mobile Drop-off Service for Targeted Divertible Materials	2	Low
Option 3.3	Stand Alone Drop-off and Reuse Centres	0	Low
Incentive Based Mechanisms			
Option 3.6	Incentive based drop off system (e.g. reverse vending machines)	2	Low

Option Number ¹	Indicator	Health Impact Score ²	Potential to Increase Health Care Costs
Option 9.8	Deposit-return System for City of Toronto for Selected Materials	2	Low
Construction, Renovation and Demolition			
Option 10.1	Depots, Processing, and Policies to Divert Construction, Renovation and Demolition (CRD) Waste	2	Low
Option 10.2	CRD material disposal bans	1	Low
Industrial, Commercial and Institutional (IC&I)			
Option 9.3	Expand City of Toronto Share of IC&I Waste Management Market	1	Low
Option 9.4	City Implements IC&I Waste Diversion Policies	1	Low
Option 9.5	City of Toronto Exits the IC&I Waste Management Service	-5	Medium
Control, Influence & Enforcement			
Option 9.7	City Explores Mechanisms to Introduce Additional Controls Over Waste Management – Bans, By-laws and Acts	1	Low
Commissioners - Transfer Stations			
Option 4.3	Procure Transfer Capacity at a Private Transfer Station in Vicinity of the Port Lands Area (if available)	-5	Medium
Option 4.1	Relocation of Transfer Station within the Port Lands Area or Designation of Land for Long-Term Relocation	-6	Medium
Option 4.2	Redirecting Waste to an Existing Transfer Station(s)	-6	Medium
Recovery – New Facilities			
Option 6.5	Organics Recycling Biocell or Biomodule Facility Development	1	Low
Option 6.2	Mixed Waste Processing with Organics Recovery Facility Development	-3	Medium
Option 6.1	Mixed Waste Processing Facility Development	-5	Medium
Option 6.7	Waste to Liquid Fuel Technologies Facility Development	-13	Medium
Option 6.4	Emerging Technologies Facility Development	-14	Medium
Option 6.3	Direct Combustion Facility Development	-15	Medium
Residual Waste			
Option 7.5	Adjust Tipping Fees or Customer Base	2	Low
Option 7.3	Bio-reactor Landfill	-2	Medium

Option Number ¹	Indicator	Health Impact Score ²	Potential to Increase Health Care Costs
Option 7.6	Purchase a new (existing) landfill	-17	Medium
Option 7.7a	Residual to 3 rd Party Disposal Facility to Preserve Landfill Capacity	-17	Medium
Option 7.7b	Residual to 3 rd Party Disposal Facility as Long Term Waste Management Option	-17	Medium
Option 7.1	Landfill Expansion	-18	Medium
Option 7.8	Greenfield Landfill	-19	Medium

¹ The numbers correspond to the original grouping presented to Council in September of 2015.

² These scores are grouped into three categories: Potential for positive health impacts (scores of greater than five); neutral (score between 0 and 4); and, potential for adverse impacts (negative scores).

Use of Precautionary Approach to Address Limitations in Methodology

To address limited information, TPH used a precautionary approach, erring on the side of caution. With more information and site-specific data available, the assessment of the options may be less uncertain; however, the potential direction of impacts (negative, neutral or positive) and the relative ranking of options are unlikely to change significantly. The use of a precautionary approach means it is unlikely that the assessment has under-predicted adverse impacts, rather some options may have a lower predicted adverse impact once more data becomes available. This type of approach is appropriate for a rapid HIA.

Potential health impacts are dependent on the location and the site-specific nature of the option. The location of the option (the City of Toronto or elsewhere) and the characteristics of the surrounding community will be important considerations. In particular, the assessment of equity (distribution of impacts within community) is dependent on the nature and characteristics of the impacted community. Because of this, the rapid HIA was largely unable to integrate equity impacts into the assessment.

Quantitative economic analysis of the potential health care costs associated with the options was not possible due to the limited information available for each option. Expert judgement was used to assess the potential for each option to increase health care costs.

In addition, the options were assessed in isolation, whereas the Waste Strategy will involve integrated approaches with a number of the options used in conjunction to increase waste diversion in the City of Toronto.

Summary and Conclusions

The City of Toronto's Waste Strategy will provide a framework for policy decisions over the next 30 to 50 years and will include ways to further reduce, reuse and recycle the City's waste.

Toronto Public Health conducted an analysis of the waste management options using a rapid HIA. The objective of the rapid HIA was to evaluate the options from a public health and equity perspective. The rapid HIA identified clear differences among the options (and categories of options) and identified a potential for both adverse and beneficial impacts on public health.

The category with the greatest potential for health and equity benefits is the Waste Reduction and Reuse category. The vast majority of the options in this category provide potential public health benefits (Food Waste Reduction Strategy, Sharing Library, Textile Collection and Reuse Strategy options). One key advantage of the Waste Reduction and Reuse category is the focus on prevention, minimization and reuse of waste, which is preferable to energy recovery and disposal strategies that require significant financial and energy resources and a greater associated potential for adverse health impacts.

The category that has the greatest potential to improve the City's waste diversion target is the Multi-residential category. Multi-residential units account for about half of the City's residential homes. However, the diversion rate is much lower than in single-residential homes (about 26% compared to 66%). There is an opportunity to improve the City's waste diversion by implementing initiatives to increase diversion in multi-residential units. A few options in this category have the potential to also benefit public health including two options for Alternative Collection Methods and the Community Composting option.

Even with a successful Waste Strategy, the City will likely still need to address residual waste. There are two Waste Strategy categories intended to address residual waste: Residual Waste category (landfill options) and Recovery – New Facilities category (for example, Direct Combustion, Emerging Technologies, and Waste to Liquid Fuel). These categories have the greatest potential adverse impacts on public health. These options also have the greatest potential environmental, social and financial impacts.

Estimates on the potential health care costs of the options are not possible to provide without site specific information on the nature, scale and location of the projects. Based on the available information and expert judgement, none of the options were identified to have a strong potential to increase health care costs.

By providing an assessment through a public health lens, strategies can be identified to enhance benefits and mitigate potential adverse impacts. Options that reduce inequalities and improve health and that also support the City's strategic priorities are preferred from a public health perspective (for example, TO Prosperity: Toronto Poverty Reduction Strategy; Transformation Toronto 2050: The Path to a Low Carbon Future; and the Toronto Food Strategy). The priority for the Waste Strategy should be to focus on options that afford the greatest opportunity to prevent, minimize, and reuse waste and that also have a potential beneficial impact on public health.