

## Latest Developments in the Canadian Economic Accounts

### Using municipal wastewater to measure Canadians' consumption of cannabis and opioids



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## Using municipal wastewater to measure Canadians' consumption of cannabis and opioids

Over the last number of months, Statistics Canada has been updating the national statistical system to measure the production, consumption and distribution of non-medical cannabis. To date, this work has involved updating classification standards (such as the North American Product Classification), developing models that take existing information (mainly from health and social surveys) and transform it into estimates of consumption and expenditure, as well as undertaking new surveys on cannabis consumption.

Moving forward, Statistics Canada will need to develop data collection instruments and infrastructure to acquire the information that the agency requires to measure the economic and social implications of the legalization of Cannabis. Data users have already indicated that they require a vast array of economic, health and public safety information to both understand the implications of legalization and to ensure that the proper policy and regulations are put in place.

The cannabis for non-medical use market is currently illegal; high quality, timely data related to production and consumption are difficult to obtain, and are expected to be so for a period of time, even after legalization. Given the difficulty in obtaining this information and the level of detail required by data users, Statistics Canada is using non-traditional methods to acquire as much information as possible. One such method is the use of wastewater analysis to measure drug consumption levels in the general population.

The use of wastewater to measure drug use is not new, having been performed in various countries for over 10 years. The European SCORE network (Sewage analysis CORE group – Europe), established in 2010 for the study of wastewater epidemiology, is both a pioneer and the worldwide authority on the measurement of population consumption of illicit drugs. In 2016, SCORE participants conducted analyses in over 70 cities in more than 28 countries, including Canada, covering various drugs such as cannabis, opioids, cocaine, amphetamines, MDMA/ecstasy and new psychoactive substances.

Over time, SCORE has refined its protocols for the collection, handling and analysis of wastewater, including the accreditation of participating laboratories. Statistics Canada will be working with SCORE-accredited laboratories to perform the analysis of wastewater collected by Canadian municipal wastewater authorities.

The methodology is relatively straightforward, at least conceptually. Typically, **daily samples are combined over time**, to provide a stable measure of drug consumption. In addition, **samples may be combined over various wastewater treatment plants serving a metropolitan area, to ensure representative coverage**. Samples are collected; the flow at the time of collection is recorded; and the samples are refrigerated, documented and sent to the laboratory for analysis. The results are then fed into a model—using wastewater flow, pharmacokinetic (which determine the fate of drugs in the organism) and population estimates—to arrive at an overall estimate of drug consumption per person. Statistics Canada is planning to adopt this methodology for the measurement of cannabis use by Canadians as well as opioid consumption owing to the urgency of its health impacts.

Estimates of drug consumption from municipal wastewater have a number of excellent statistical properties including:

- low collection costs;
- no burden on household or business respondents;
- no infringement of personal privacy or confidentiality;
- real-time reporting;
- low or no response bias;
- ability to develop geographically granular estimates;
- ability to detect short-term trends in response to policies and changing conditions; and
- capacity for retrospective analysis for other drugs and metabolites, using stored samples.

The measurement of cannabis and opioid production, distribution and consumption is very complex; as a result, Statistics Canada requires the support of Canadians, provincial and municipal governments, and businesses to produce timely and relevant statistics. In our consultations with federal, provincial and territorial authorities, it has become clear that the measurement of cannabis and opioids from wastewater will meet a number of needs at all levels of government, including public health and safety.

- Data from municipal wastewater can provide high-quality baseline information at the city level, helping to understand regional differences in consumption and its implications.
- Once cannabis is legalized, these data may provide an indication of the size of the underground economy by subtracting consumption from legal sources from total consumption.
- Given the recurring and timely nature of these data, municipalities and health authorities will be able to assess the impact of cannabis legalization first as it initially occurs, and, second, as governments make legal various cannabis products such as edibles, concentrates and health and wellness products.

As a starting point, Statistics Canada is partnering with a number of municipalities to obtain daily samples, which will then be shipped to the accredited laboratory where they will be tested, the test results will then sent on to Statistics Canada who, finally, will run the results through its model to calculate population-level estimates of consumption and disseminate the results to Canadians.

Owing to the normal uncertainty associated with chemical sampling and analysis, and the assumptions that go into transforming drug concentrations in wastewater into pollution-level consumption levels, these estimates come with a fairly large degree of uncertainty. These estimates also will be compared to other data sources on consumption, obtained principally from social and health surveys of the population. While the estimates of population consumption based on wastewater will involve some uncertainty, it is expected that they will provide, at fairly frequent intervals, a clear indication of time trends in cannabis and opioid use.

This information will also be complementary to other sources of data on drug use, such as population surveys, where information is gathered on prevalence, frequency of use, social and demographic characteristics of the drug user, as well as other information surrounding drug consumption and the effects of drug use.

The first results of this work are expected in the middle of April and will be an important source of information in understanding how behaviour changes as cannabis legalization approaches, and as opioid use and policies evolve. Over time, these data will be made available as one of Statistics Canada's standard data products.

Statistics Canada appreciates the collaboration of the municipalities and all Canadians as it works to provide timely, high-quality information on the legalization of cannabis and on other social and economic issues.