



WCSA Contraband Tobacco Saskatchewan Study September - October 2016

Western Convenience Stores Association

Final Report

Prepared by:
NIRIC Analytics
<http://niric-analysis.com/>

October, 2016



Table of Contents

<i>Executive Summary</i>	<i>i</i>
<i>1. Introduction and Background.....</i>	<i>1</i>
<i>2. Methodology.....</i>	<i>2</i>
<i>3. Findings</i>	<i>5</i>
<i>4. A Comparative Analysis.....</i>	<i>8</i>

Executive Summary

The illicit sale of cigarettes and other tobacco products seriously undermines the health, safety and well-being of communities. The Western Convenience Stores Association (WCSA) funded a study to inform on the potential prevalence of contraband cigarettes in the province of Saskatchewan.

The study was based on a research protocol developed in 2009 by NIRIC (an independent, Québec-based research firm) in conjunction with the WCSA. To date, NIRIC has completed more than 30 of these studies across Canada.

The methodology involves the collection and analysis of used cigarette ends (cigarette butts) collected from common smoking areas (zones) near public places such as retail malls, public and postsecondary educational institutions, office buildings, hospitals, recreational facilities, etc.

Sample collection was done in the last week of September and in the first week of October 2016 from 28 sites. A total of 4,761 useable samples were collected and analyzed with identified contraband product representing 11.7% at the all-site level.

The prevalence of contraband cigarettes at the 28 sites studied ranged from 0.0% to 23.1%. The margin of error at the 95% level of confidence is 2.4%. If we apply this error margin to the contraband average, we could conclude that 95% of time the average is between 9.3% and 14.1% (Exhibit 1).

The variability in individual site findings is clearly reflected in values associated with the mean: the site prevalence mean is 11.7%; with an error margin of 2.4%; and the median value is 11.1%.

<i>2016 Contraband Analysis</i>	
Mean	11.7%
Standard Error	1.2%
Median	11.1%
Standard Deviation	6.1%
Sample Variance	0.4%
Kurtosis	-0.423
Skewness	0.241
Range	23.1%
Minimum	0.0%
Maximum	23.1%
Count	28
Confidence Level (95.0%)	2.4%

Exhibit 1

Findings provide insight into the potential level of contraband cigarette consumption in Saskatchewan, but they cannot statistically be extrapolated to the population of contraband cigarette smokers in the province.

To put the study of September - October 2016 in some context, the findings were compared with the Saskatchewan studies of 2013 and 2015 commissioned by the WCSA using the same research protocols.

The mean of contraband prevalence in 2013 was 10.5%, followed by 9.6% in 2015 and 11.7% this year. As can be seen in Exhibits 2 and 3, there is a similarity in prevalence per site between the 2013 and 2016 studies. A test of the means did detect a statistically difference between the 2015 and 2016 studies. The 2016 study is also statistically similar with the 2013 study and show a clear increase of the mean when compare to the 2015 study.

<i>2013 Contraband Analysis</i>	
Mean	10.5%
Standard Error	1.1%
Median	9.3%
Standard Deviation	6.2%
Sample Variance	0.4%
Kurtosis	-0.162
Skewness	0.489
Range	0.261
Minimum	0.0%
Maximum	26.1%
Count	32
Confidence Level (95.0%)	2.2%

Exhibit 2

<i>2015 Contraband Analysis</i>	
Mean	9.6%
Standard Error	1.1%
Median	7.8%
Standard Deviation	5.8%
Sample Variance	0.3%
Kurtosis	-0.450
Skewness	0.637
Range	22.0%
Minimum	0.3%
Maximum	22.2%
Count	29
Confidence Level (95.0%)	2.2%

Exhibit 3

Notable among the findings of the 2016 study are the high prevalence levels of contraband cigarettes near City Facility (16.9%) and Commercial sites (16.1%) (Exhibit 4).

Site type	Qty	Contraband
City Facility	3	16.9%
Commercial	9	16.1%
Government	9	10.5%
School	11	8.5%

Exhibit 4

The 2016 study included an analysis for the presence of menthol flavored cigarettes.

The prevalence of menthol cigarettes at the 28 sites studied ranged from 0.0% to 6.8%. The margin of error for the entire sample at the 95% level of confidence is 0.66%.

The low variability in individual site findings is clearly reflected in values associated with the mean: the site prevalence mean is 1.34%; the mean at the 95% confidence is 0.66%; and the median value is 0.80% (Exhibit 5).

<i>2016 Menthol Statistic analysis</i>	
Mean	1.34%
Standard Error	0.32%
Median	0.80%
Standard Deviation	1.70%
Sample Variance	0.03%
Kurtosis	3.102
Skewness	1.730
Range	6.8%
Minimum	0.0%
Maximum	6.8%
Count	Exhibit 5 28
Confidence Level (95.0%)	0.66%

Findings provide insight into the potential level of menthol cigarette consumption in Saskatchewan, but they cannot statistically be extrapolated to the population of menthol cigarette smokers in the province. Caution should be used in interpreting findings given the small sample sizes.

Due to the study methodology, study findings cannot be extrapolated to the population of contraband cigarette users in Saskatchewan. The findings do, however, strongly suggest that the consumption of contraband cigarettes in Saskatchewan is increasing since 2015 and continues to be well above levels that are acceptable to legal retailers, governments, enforcement agencies and the public at large. The prevalence of menthol cigarettes in Saskatchewan went down since 2015 with 35% of site with zero menthol products.

1. Introduction and Background

Contraband or illegal cigarettes are defined as cigarette products that do not comply with the provisions of applicable federal and provincial statutes. The illicit sale of cigarette products contributes to:

- increased health risks;
- increased cigarette uses by minors;
- increased criminal activity;
- loss of government revenue;
- loss of revenue by retailers selling legal products.

Contraband cigarettes have been a major issue for Canada's convenience store industry for some time. To inform on the situation, the industry-through the Western Convenience Stores Association-has commissioned a series of contraband cigarette studies.

The Western Convenience Stores Association (WCSA) is a not-for-profit industry association and a regional affiliate of the Canadian Convenience Stores Association. For several years, the Association has commissioned contraband cigarette studies in Saskatchewan.

This report presents the findings from the most recent research done in September and October 2016 along with a comparative analysis between this study and the studies done in 2013 and 2015.

2. *Methodology*

In 2009, NIRIC (an independent, Québec-based research firm) developed a research protocol for a controlled cross-sectional study to evaluate the prevalence of illegal cigarettes in public places. This approach was adopted as it provides one of the highest concentrations of types of cigarettes smoked by a wide variety of smokers.

Each study involves the analysis of used cigarette ends (cigarette butts) collected from common smoking areas (zones) near public places such as retail malls, public and postsecondary educational institutions, office buildings, hospitals, recreational facilities, etc.

To date, NIRIC has conducted more than 30 such studies across Canada.

One or more outdoor smoking zones are typically found near a target location. These may be an equipped smoking area (e.g., benches, cigarette disposal containers, etc.) or an informal gathering spot for smokers.

The quality of the cigarette ends is very important and the following inclusion criteria are used to identify a valid sample:

- the filter and 50 mm of the tobacco part of the cigarette are still visible;
- the cigarette end is still in its original form (not open or twisted);
- the cigarette end is not burnt (original color still intact); and
- the cigarette end is dry.

The following procedures are followed for each study:

1. Site locations are identified in consultation with the client.
2. A sample collection time window is established in consultation with the client.
3. Local researchers are scheduled.
4. Pre-collection site visits are conducted where practical.
5. Local researchers are on stand-by monitoring weather conditions and other collection timing determinants.
6. Either pre-collection or day of, each site is photographed, including:
 - general photograph of the front and back of the site;
 - a photograph of each zone identified;
 - Close-up photographs of discarded cigarette ends.
 - Each photo is identified with a name of site-type of photo-date.jpg filename.

7. Post-collection, photo file data is entered into an Excel spreadsheet with column headings:
 - Photo Title
 - Name of Site
 - Type of Photograph (general front or back, zone # or close to zone #)
 - Collection Date
8. Completed photographs and files are uploaded online to NIRIC's FTP site.
9. A minimum of 115 and a maximum of 200 cigarette ends meeting inclusion criteria are collected at each site.
10. Where there is more than one zone, local researchers sample across all zones where practical.
11. The excluded cigarette ends are left on site.
12. For each zone, cigarette ends meeting inclusion criteria are placed in a resealable clear polyethylene bag.
13. Each bag is sealed and then sealed again with masking tape.
14. Each bag is identified with:
 - site name;
 - zone number;
 - date and time of collection;
 - name of sample collector;
 - weather conditions (sun, cloudy, rain, snow, etc.).
15. After approximately six (6) site collections have been completed, samples are packaged in a Purolator rigid corrugated shipping box and shipped priority rate to NIRIC's lab.
16. For each box received, NIRIC lab technicians open each box and verify the state of each sample bag and the completeness of the identification information.
17. Each sample bag is registered in the tracking file under the status received.
18. Each bag is opened and cigarette ends are manually inspected and sorted by comparison with the distinctive signs database. Sorting is done by legal or illegal brand.
 - In some studies, the sorting is done by brand to provide a by-brand count.
 - Cigarettes ends that cannot be identified are discarded from the sample.
 - When a brand cannot be matched to the database, the cigarette end is segregated in a resealable poly bag, identified and logged for further analysis.

- For further analysis, the cigarette end is first photographed and described. It is then dismantled and the paper, filter and tobacco examined. Chemical analysis may be done on the cigarette end components where appropriate.
 - The analysis ultimately determines if the sample is an existing brand or a new brand. An existing brand is returned to the location and zone sample lot and counted as legal or illegal. A new brand is entered into the database and the sample is then returned to the location and zone sample lot and counted as legal or illegal.
19. When completed, sorted samples from each original sample bag are bagged separately (legal, illegal, brand, etc.), and identified. Counts for each original sample bag are then recorded in the master study file (counts, bag and location).
20. When an area/city is completed, results are analyzed and used for the report production. Findings are communicated in this written report.

3. Findings

Thirty (30) sites were identified for the study. Targeted sites were located across Saskatchewan and represented a variety of public uses. Sample collection was completed between September 29th and October 11th. On the day of collection, cigarette ends were found in 28 sites. The site cleaning procedure used in some sites created a non-viable sample for 2 sites.

A total of 4,761 useable samples from the 28 sites were analyzed with identified contraband product representing 11.7% of the total. Individual sites and site counts are summarized below in Exhibit 6.

Saskatchewan Contraband Cigarette

Study

September – October 2016

Site Name	Community	Site Type	Total Sample	Contraband Count	Site Pct.	Menthol Count	Menthol Pct.
Confederation Mall	Saskatoon	Commercial	221	51	23.1%	2	0.9%
Grosvenor Park Centre	Saskatoon	City Facility	193	43	22.3%	10	5.2%
Casino Regina	Regina	Government	178	38	21.3%	0	0.0%
Model-T Bar and Grille	Saskatoon	Commercial	231	49	21.2%	5	2.2%
Vangelis Tavern	Saskatoon	Commercial	133	27	20.3%	9	6.8%
The OUTside Nightclub	Regina	Commercial	176	28	15.9%	1	0.6%
Michael A. Riffel High School	Regina	School	164	26	15.9%	2	1.2%
Mosaic Stadium at Taylor Field	Regina	City Facility	165	23	13.9%	3	1.8%
Thom Collegiate	Regina	School	143	19	13.3%	1	0.7%
Taylor Field Regina	Regina	City Facility	132	17	12.9%	3	2.3%
Northgate Mall	Regina	Commercial	187	24	12.8%	7	3.7%
Royal Canadian Mounted Police Heritage Centre.	Regina	Government	215	27	12.6%	2	0.9%
Winston Knoll Collegiate	Regina	School	152	18	11.8%	0	0.0%
Walter Murray Collegiate	Saskatoon	School	139	16	11.5%	4	2.9%
Vanier Collegiate	Moose Jaw	School	121	13	10.7%	0	0.0%
St. Paul's Hospital	Saskatoon	Government	196	21	10.7%	0	0.0%
Louis	Saskatoon	Commercial	215	23	10.7%	2	0.9%
Cornwall Centre	Regina	Commercial	257	27	10.5%	1	0.4%
Regina General Hospital	Regina	Government	226	20	8.8%	0	0.0%
Nutana Collegiate	Saskatoon	School	131	11	8.4%	0	0.0%
Bishop James Mahoney High School	Saskatoon	School	143	12	8.4%	2	1.4%
Royal Saskatchewan Museum	Regina	Government	120	9	7.5%	0	0.0%
Royal University Hospital	Saskatoon	Government	237	16	6.8%	6	2.5%
Legislative Building Regina	Regina	Government	167	9	5.4%	1	0.6%
Cochrane High School	Regina	School	119	4	3.4%	3	2.5%
Riverview Collegiate Institute	Moose Jaw	School	149	5	3.4%	0	0.0%
St. Joseph High School	Saskatoon	School	128	4	3.1%	0	0.0%
Mount Royal Collegiate	Saskatoon	School	123	0	0.0%	0	0.0%

Exhibit 6

The prevalence of contraband cigarettes at the 28 sites studied ranged from 0.0% to 23.1%. The statistical analysis of the data demonstrates with a confidence level of 95% an error margin of 2.4%. If we apply this error margin to the contraband average, we could conclude that 95% of time the average is between 9.3% and 14.1% (Exhibit 7).

The variability in individual site findings is clearly reflected in values associated with the mean: the site prevalence mean is 11.7%; with an error margin of 2.4%; and the median value is 11.1%

<i>2016 Contraband Analysis</i>	
Mean	11.7%
Standard Error	1.2%
Median	11.1%
Standard Deviation	6.1%
Sample Variance	0.4%
Kurtosis	-0.423
Skewness	0.241
Range	23.1%
Minimum	0.0%
Maximum	23.1%
Count	28
Confidence Level (95.0%)	2.4%

Exhibit 7

Notable among the findings of the 2016 study are the high prevalence levels of contraband cigarettes near City Facility (16.9%) and Commercial sites (16.1%) (Exhibit 8).

	Total Sample	Contraband Count	Site Pct.
City Facility	490	83	16.9%
Commercial	1420	229	16.1%
Government	1339	140	10.5%
School	1512	128	8.5%

Exhibit 8

Overall it is difficult to draw any meaningful conclusions of contraband tobacco use by type of site based on one study and the findings of this one study. The same can be said for findings based on geographic location provincially.

The regions/cities with the highest prevalence of contraband cigarettes is Saskatoon closely followed by Regina. The Region of Moose Jaw is alone with a much lower prevalence of contraband cigarettes (Exhibit 9).

	2016				
Region/city	Total Sample	Contraband Count	Site Pct.	Menthol Count	Menthol Pct.
Saskatoon	2090	273	13.1%	40	1.9%
Regina	2401	289	12.0%	24	1.0%
Moose Jaw	270	18	6.7%	0	0.0%

Exhibit 9

The 2016 study included an analysis for the presence of menthol flavored cigarettes given that the sale of flavored tobacco might be ban in the near future with the National ban project announced by the Federal Minister of Health in 2016.

The prevalence of menthol cigarettes at the 28 sites studied ranged from 0.0% to 6.8%. The margin of error for the entire sample at the 95% level of confidence is 0.66%.

The low variability in individual site findings is clearly reflected in values associated with the mean: the site prevalence mean is 1.34%; the mean at the 95% confidence is 0.66%; and the median value is 0.80% (Exhibit 10).

<i>2016 Menthol Statistic analysis</i>	
Mean	1.34%
Standard Error	0.32%
Median	0.80%
Standard Deviation	1.70%
Sample Variance	0.03%
Kurtosis	3.102
Skewness	1.730
Range	6.8%
Minimum	0.0%
Maximum	6.8%
Count	28
Confidence Level (95.0%)	0.66%

Exhibit 10

Findings provide insight into the potential level of menthol cigarette consumption in Saskatchewan, but they cannot statistically be extrapolated to the population of menthol cigarette smokers in the province. There is no significant difference in between the site types or the regions/cities regarding the level of menthol cigarettes. Caution should be used in interpreting findings given the small sample sizes.

4. *A Comparative Analysis*

In 2013 and 2015, NIRIC completed a contraband cigarette study in Saskatchewan involving largely the same sites and using the same research protocols. To put the study of September - October 2016 in some context, the findings were compared with the two previous studies.

The mean of contraband prevalence in 2013 was 10.5%, followed by 9.6% in 2015 and 11.7% this year. As can be seen in Exhibits 11 and 12, there is a similarity in prevalence per site between the 2013 and 2016 studies. A test of the means did detect a statistically difference between the 2015 and 2016 studies. The 2016 study is also statistically similar with the 2013 study and show a clear increase of the mean when compare to the 2015 study.

<i>2013 Contraband Analysis</i>	
Mean	10.5%
Standard Error	1.1%
Median	9.3%
Standard Deviation	6.2%
Sample Variance	0.4%
Kurtosis	-0.162
Skewness	0.489
Range	0.261
Minimum	0.0%
Maximum	26.1%
Count	32
Confidence Level (95.0%)	2.2%

Exhibit 11

<i>2015 Contraband Analysis</i>	
Mean	9.6%
Standard Error	1.1%
Median	7.8%
Standard Deviation	5.8%
Sample Variance	0.3%
Kurtosis	-0.450
Skewness	0.637
Range	22.0%
Minimum	0.3%
Maximum	22.2%
Count	29
Confidence Level (95.0%)	2.2%

Exhibit 12

As can be seen in Exhibits 13, there is a clear increase of the mean in 2016 compare with the 2015 study.

Saskatchewan Contraband Cigarette Studies
(Contraband Prevalence (Mean %))

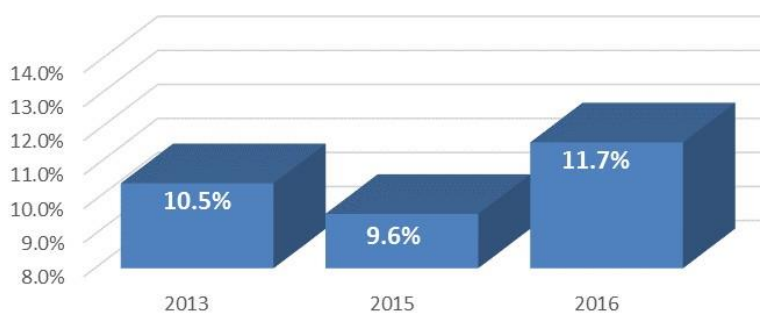


Exhibit 13

We conducted a statistical test on the means in order to test the similarity of the studies. The standard error range of the three studies overlap in a range of 50% and when compared two by two the studies of 2013 and 2016 overlap in excess of 80%. With these findings, we can conclude the means of the 2013 and 2016 are statically similar. The mean of the 2015 study is statistically lower than the mean of the 2016 study.

Exhibits 14, 15 and 16 below summarize the contraband prevalence findings from the three studies. The site prevalence mean was highest in 2016 near city facilities, the government sites and the school sites were very similar in the three studies and the city facility sites seems to be increasing over the years. Regarding the geographic prevalence, all of the regions/cities had an increase in contraband prevalence between 2015 and 2016.

	2013			2015			2015		2016			2016	
	Total Sample	Contraband Count	Site %	Total Sample	Contraband Count	Site %	Menthol Count	Menthol %	Total Sample	Contraband Count	Site %	Menthol Count	Menthol %
School	1501	107	7.1%	1625	115	7.1%	18	1.1%	1512	128	8.5%	12	0.8%
Government	1384	138	10.0%	1146	120	10.5%	18	1.6%	1339	140	10.5%	9	0.7%
Commercial	1430	234	16.4%	1847	189	10.2%	47	2.5%	1420	229	16.1%	27	1.9%
City Facility	398	30	7.5%	533	62	11.6%	13	2.4%	490	83	16.9%	16	3.3%

Exhibit 14

Region/city	2013			2015			2015		2016			2016	
	Total Sample	Contraband Count	Site %	Total Sample	Contraband Count	Site %	Menthol Count	Menthol %	Total Sample	Contraband Count	Site %	Menthol Count	Menthol %
Moose Jaw	283	13	4.6%	268	12	4.5%	1	0.4%	270	18	6.7%	0	0.0%
Regina	2222	271	12.2%	2504	241	9.6%	43	1.7%	2401	289	12.0%	24	1.0%
Saskatoon	1879	208	11.1%	2379	233	9.8%	52	2.2%	2090	273	13.1%	40	1.9%

Exhibit 15

Saskatchewan Contraband Cigarette

September - October, 2016

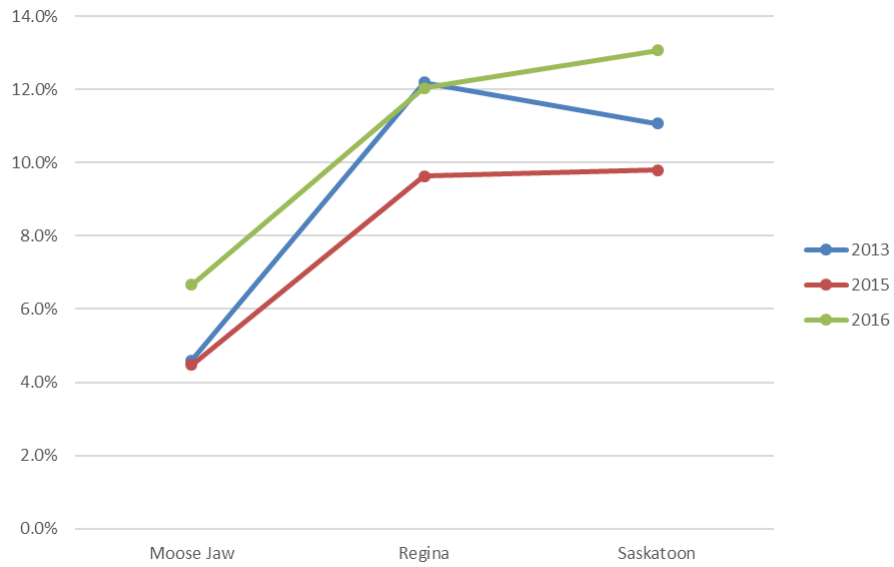


Exhibit 16

Overall, findings suggest that there is likely an increase of contraband cigarettes in all of the regions/cities based on a percentage increase since 2015.

Due to the study methodology, study findings cannot be extrapolated to the population of contraband cigarette users in Saskatchewan. The findings do, however, strongly suggest that the consumption of contraband cigarettes in Saskatchewan is increasing since 2015 and continues to be well above levels that are acceptable to legal retailers, governments, enforcement agencies and the public at large.