

## 1. Background and Purpose of Analysis

The purpose of this analysis is to provide descriptive statistics around current smokeless tobacco use over time for the smokeless tobacco category in total and by subcategories and transitions within the smokeless tobacco category.

## 2. Population and Data source:

**Adult Tobacco Consumer Tracker (ATCT) 2013-2020 (21+)**

**Population Assessment of Tobacco and Health (PATH) Study Wave 1-Wave 4 Adult Data (18+)**

(Combined PATH Data based on ICPSR\_36498 downloaded in Nov 2019)

## 3. Definitions and measures:

### ATCT

- Past 30-Day moist smokeless tobacco (MST)/dip Use: Reported use of MST/dip in the past 30 days
- Past 30-Day Snus Use: Reported use of snus in the past 30 days
- Past 30-Day Chewing Tobacco Use: Reported use of chewing tobacco in the past 30 days
- Past 30-Day Total Smokeless Tobacco (Total ST) use: Reported use of MST/dip, snus or chewing tobacco in the past 30 days.
- Note: In ATCT, TOTAL Smokeless Tobacco (Total ST) includes MST/dip, snus and chewing tobacco.

### PATH

- Current Smokeless Tobacco Use (loose snus, moist snuff, dip, spit or chewing tobacco): Reported currently using smokeless tobacco (loose snus, moist snuff, dip, spit or chewing tobacco) every day or some days
- Current Snus Use (Snus pouches): Reported currently using snus every day or some days
- Current Total Smokeless Tobacco (Total ST) Use: Reported use of smokeless tobacco (loose snus, moist snuff, dip, spit or chewing tobacco) or snus
- Note: In PATH, TOTAL Smokeless Tobacco (Total ST) includes smokeless tobacco (loose snus, moist snuff, dip, spit or chewing tobacco) and snus

**For longitudinal analysis of tobacco product transitions, we only look at transitions of established use states. The established criteria are 'having smoked 100 or more cigarettes in entire life' for cigarette smokers and 'having used the product fairly regularly' for smokeless tobacco and snus users.**

Note: Smokeless Tobacco Description in PATH W1: smokeless tobacco which you put in your mouth. Frequently you chew, suck or spit while using smokeless tobacco, although there is no need to do so for some types. Snus, for instance, is a type of smokeless tobacco that comes in a small pouch that you put inside your lip.

## 4. Results

### 4.1. Results based on ATCT 2014-2020 Data

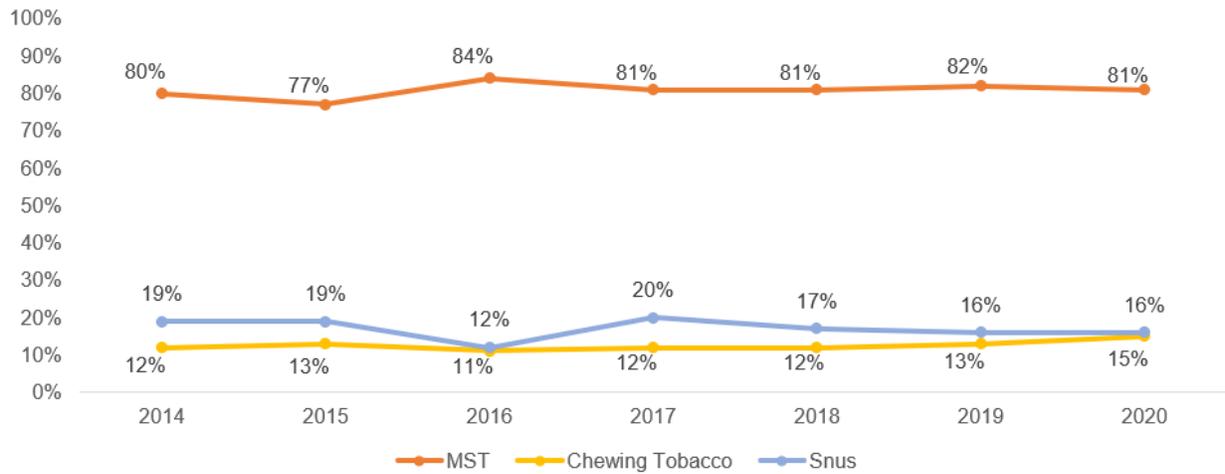
Table 4.1 shows a consistent pattern that majority (about 80%) of smokeless tobacco users are MST users based on ATCT 2014-2020 data. The percentages of respondents who used total ST and each of the smokeless tobacco products (MST, chewing tobacco and snus) in past 30 days are calculated. The rows under 'Not Mutually Exclusive Use States' section show percentages of past 30-day users irrespective of other smokeless tobacco product usage. As an example, 81% of past 30-day total ST users reported past 30-day use of MST in ATCT 2020 data. The corresponding data is shown in Figure 4.1.1.

The rows under 'Mutually Exclusive Use States' section display percentages of past-30 day use of one, two or three smokeless tobacco products by taking the other smokeless tobacco product use into account. As an example, we observe 71% of past 30-day total ST users reported past 30-day use of MST exclusive of chewing tobacco or snus in ATCT 2020 data. The corresponding data is shown in Figure 4.1.2.

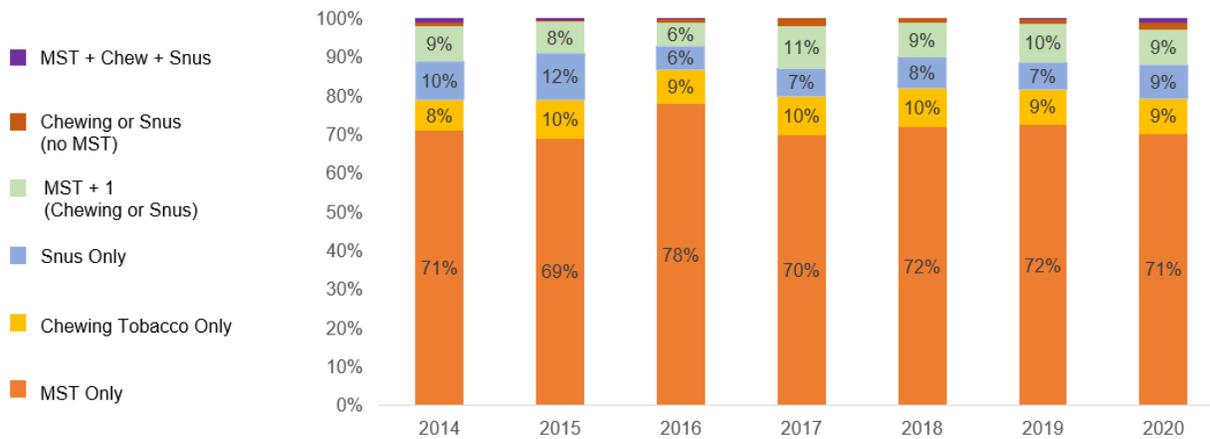
**Table 4.1. Percentage of Respondents who Used MST, Chewing Tobacco and Snus in Past 30 Days among Total ST Users (Not Mutually Exclusive Use States) (ATCT 2014-2020)**

	2014	2015	2016	2017	2018	2019	2020
	<b>N</b>						
<b>ATCT Sample Size</b>	21,061	28,242	42,627	27,995	28,318	28,533	28,866
<b>Total ST Users</b>	569	682	988	577	647	732	632
	<b>Weighted Percentage Among Total ST Users Not Mutually Exclusive Use States</b>						
<b>MST</b>	80%	77%	84%	81%	81%	82%	81%
<b>Chewing Tobacco</b>	12%	13%	11%	12%	12%	13%	15%
<b>Snus</b>	19%	19%	12%	20%	17%	16%	16%
	<b>Weighted Percentage Among Total ST Users Mutually Exclusive Use States</b>						
<b>MST Only</b>	71%	69%	78%	70%	72%	72%	71%
<b>Chewing Tobacco Only</b>	8%	10%	9%	10%	10%	9%	9%
<b>Snus Only</b>	10%	12%	6%	7%	8%	7%	9%
<b>MST + 1 (Chewing or Snus)</b>	9%	8%	6%	11%	9%	10%	9%
<b>Chewing or Snus (no MST)</b>	1%	0.4%	1%	2%	1%	1%	2%
<b>MST + Chew + Snus</b>	1%	0.5%	0.1%	NA	NA	0.2%	1%

**Figure 4.1.1. Percentage of Respondents who Used MST, Chewing Tobacco and Snus in Past 30 Days among Total ST Users (Not Mutually Exclusive Use States) (ATCT 2014-2020)**



**Figure 4.1.2. Percentage of Respondents who Used MST, Chewing Tobacco and Snus in Past 30 Days among Total ST Users (Mutually Exclusive Use States) (ATCT 2014-2020)**



**4.2. Results based on PATH Wave 1 to Wave 4 Cross-Sectional Analysis**

Table 4.2 shows the prevalence of the smokeless tobacco and snus categories are relatively stable based on secondary analysis of the PATH Wave 1 to Wave 4 cross-sectional data. The percentages of respondents who reported current use of total ST with subcategories of smokeless tobacco (loose snus, moist snuff, dip, spit or chewing tobacco) and snus are calculated.

The rows under ‘Not Mutually Exclusive Use States’ section show percentages of current users irrespective of other smokeless tobacco product usage. As an example, 93.96% of current total ST users

reported past 30-day use of smokeless tobacco (loose snus, moist snuff, dip, spit or chewing tobacco) in PATH Wave 4 data. The corresponding data is shown in Figure 4.2.1.

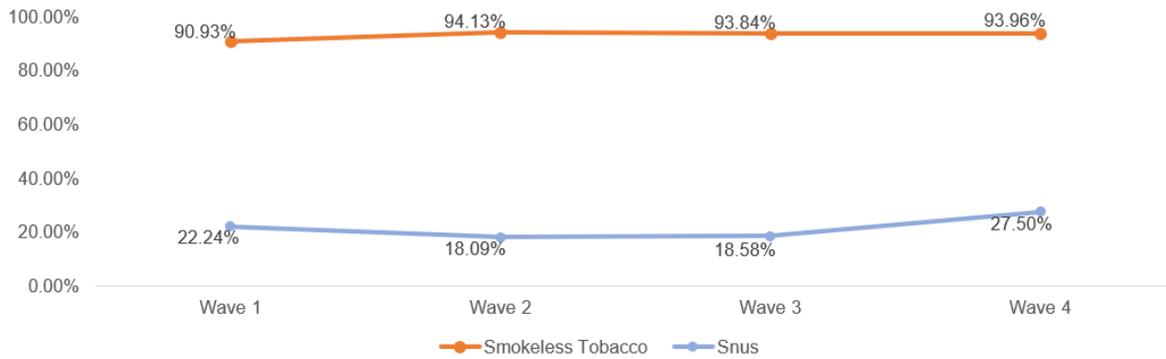
The rows under 'Mutually Exclusive Use States' section display percentages of current use of one, two or three smokeless tobacco products by taking the other smokeless tobacco product use into account. As an example, we observe 72.50% of current total ST users reported past 30-day use of smokeless tobacco (loose snus, moist snuff, dip, spit or chewing tobacco) exclusive of snus in PATH W4 data. The corresponding data is shown in Figure 4.1.2.

Additionally, we also analyzed the reported use of brand and sub-brand of smokeless tobacco (loose snus, moist snuff, dip, spit or chewing tobacco) in PATH Wave 4 and observed that among current ST product users, 74% reported using a moist smokeless tobacco brand as regular brand.

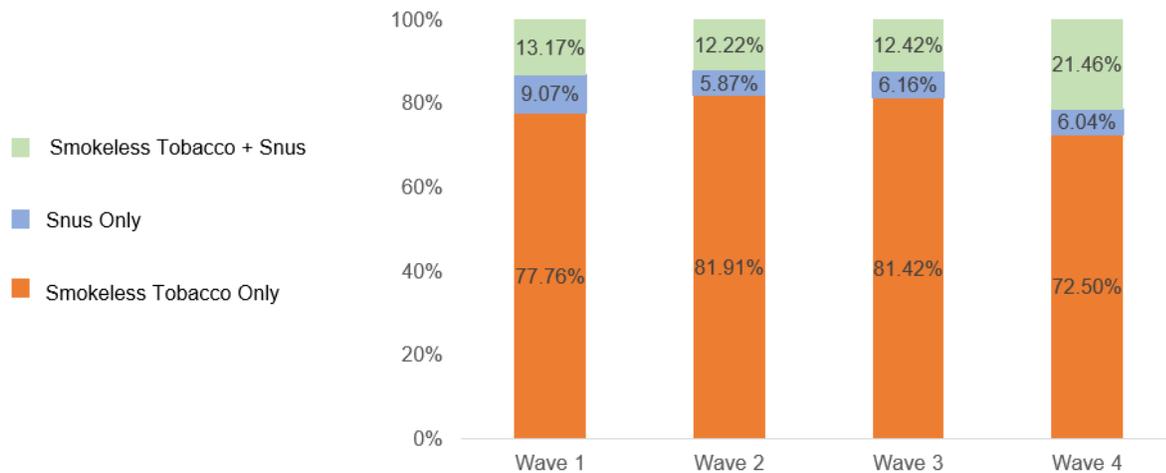
**Table 4.2. Percentage of Respondents who Used Smokeless Tobacco (Loose snus, moist snuff, dip, spit or chewing tobacco) and Snus among Total ST Users (PATH Wave 1-Wave 4 Cross-Sectional Data)**

	Wave 1	Wave 2	Wave 3	Wave 4
	<b>N</b>			
<b>PATH Sample Size</b>	32,320	28,359	28,146	33,643
<b>Total ST Sample Size</b>	2,061	1,479	1,412	1,553
<b>Total ST Prevalence</b>	3.39%	2.96%	3.03%	3.02%
<b>Total ST Population Counts</b>	8.01M	7.05M	7.25M	7.36M
	<b>Weighted and Population Percentage Among Total ST Users Not Mutually Exclusive Use States</b>			
<b>Smokeless Tobacco</b>	90.93%	94.13%	93.84%	93.96%
	7.28M	6.63M	6.80M	6.91M
<b>Snus</b>	22.24%	18.09%	18.58%	27.50%
	1.78M	1.27M	1.35M	2.02M
	<b>Weighted Percentage Among Total ST Users Mutually Exclusive Use States</b>			
<b>Smokeless Tobacco Only</b>	77.76%	81.91%	81.42%	72.50%
<b>Snus Only</b>	9.07%	5.87%	6.16%	6.04%
<b>Smokeless Tobacco + Snus</b>	13.17%	12.22%	12.42%	21.46%

**Figure 4.2.1. Percentage of Respondents who Used Smokeless Tobacco (Loose snus, moist snuff, dip, spit or chewing tobacco) and Snus in Past 30 Days among Total ST Users (Not Mutually Exclusive Use States) (PATH Wave 1 – Wave 4)**



**Figure 4.2.2. Percentage of Respondents who Used Smokeless Tobacco (Loose snus, moist snuff, dip, spit or chewing tobacco) and Snus in Past 30 Days among Total ST Users (Mutually Exclusive Use States) (PATH Wave 1 – Wave 4)**



### 4.3. PATH Wave 1 to Wave 4 Longitudinal Analysis

Lastly, we conducted analysis of PATH Wave 1 to Wave 4 longitudinal data based on adults continuing from Wave 1 to Wave 4. The analysis (shown in Table 4.3) focused on Wave 1 current users of snus or smokeless tobacco (loose snus, moist snuff, dip, spit or chewing tobacco) and looked at their smokeless tobacco product or snus use states at Wave 2 and Wave 4, respectively. Based on 4.3, we observe minimal likelihood of transitions between smokeless tobacco (loose snus, moist snuff, dip, spit or chewing tobacco) and snus as most of the transitions are not statistically reliable and the raw cell counts are less than 10. For example, among smokeless tobacco (loose snus, moist snuff, dip, spit or chewing tobacco) users who do not use snus at Wave 1, 0.31%<sup>†</sup> (n=3) transitioned to snus use and reported no smokeless tobacco (loose snus, moist snuff, dip, spit or chewing tobacco) use at Wave 2. When we look at Wave 4 data, this transition probability is 0.55%<sup>†</sup> (n=6) and it is still not statistically reliably due to low occurrence.

**Table 4.3.** Proportion of Users that Reported Current Use of Snus or Smokeless Tobacco (Loose snus, moist snuff, dip, spit or chewing tobacco) at Wave 2 and Wave 4 AMONG Wave 1 Current Users of Snus or Smokeless Tobacco (Loose snus, moist snuff, dip, spit or chewing tobacco), irrespective other tobacco products (cigarette, e-vapor, cigar, etc) usage

Wave 1		Wave 2 Current Use of			Wave 4 Current Use of		
	n	Smokeless Tobacco (exclusive of snus)	Smokeless Tobacco + Snus	Snus (exclusive of smokeless tobacco)	Smokeless Tobacco (exclusive of snus)	Smokeless Tobacco + Snus	Snus (exclusive of smokeless tobacco)
Smokeless Tobacco (exclusive of Snus)	847	74.33%	3.39%	0.31% <sup>†</sup> (n=3)	64.20%	6.89%	0.55% <sup>†</sup> (n=6)
Smokeless Tobacco + Snus	89	39.49%	31.45%	4.02% <sup>†</sup> (n=5)	43.12%	18.81%	0.73% <sup>†</sup> (n=1)
Snus (exclusive of smokeless tobacco)	60	1.35% <sup>†</sup> (n=1)	11.75% <sup>†</sup> (n=6)	40.09%	13.50% <sup>†</sup> (n=7)	11.11% <sup>†</sup> (n=6)	23.31%

<sup>†</sup>Low statistical precision as cell sample size less than 5 or coefficient of variation greater than 30%. Cell sizes are provided for low statistical precision estimates to show the low occurrence of the specific transition.