



# Synar 2016 (FFY 2017) Report

## *Synar Inspection Study and Electronic Nicotine Delivery System (ENDS) Pilot Study*

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## ABOUT THIS REPORT

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# Executive Summary

## *2016 Synar Inspection Study*

“Activities to increase restrictions on tobacco product sales and availability” are key to reducing “availability of tobacco products” and “susceptibility to experimentation with tobacco products.” Over time, these activities reduce initiation of tobacco use, the prevalence of tobacco use among young people, and the morbidity and mortality that result from tobacco use (Centers for Disease Control and Prevention [CDC], 2014, p. 21). The Synar amendment and related monitoring of compliance with state laws against selling tobacco products to minors are key parts of tobacco prevention efforts nationally and in Wyoming.

The 2016 (FFY 2017) weighted Synar tobacco retailer violation rate (RVR) was 11.7%, below the federally stipulated maximum of 20.0%. However, this violation rate was also higher than usual. The Wyoming Survey & Analysis Center at the University of Wyoming (WYSAC) was able to identify high violation rates in two of the 10 trips as key factors in the high overall RVR. For one of these trips, WYSAC was able to further isolate the high violation rate to one of the two youth. For the other trip, the two youth had similar violation rates. The protocol used for the Synar Inspection Study does not allow WYSAC to determine whether the high violation rates were because of youth characteristics (e.g., coming across as older because of a mix of appearance and confidence during the inspections), differences in driver training of the youth for those specific trips (though no driver had more than one trip with an anomalously high RVR), or geographical factors (e.g., potential differences in local law enforcement or FDA enforcement activity).

As in all Synar results since 2007 (WYSAC, 2015), clerks who asked the youth inspectors for identification (which the youth did not provide) were much less likely to violate than clerks who failed to ask for identification. Only three clerks (two cigarette inspections and one smokeless tobacco inspection out of 175 completed inspections)<sup>1</sup> asked for identification and then committed a violation by being willing to sell the tobacco product.

Based on these results, the action most likely to maintain or improve Wyoming’s Synar violation rate would be to educate retailers on the importance of reviewing customer identification during all tobacco sales. These efforts could be conducted with or independent of local law enforcement inspections. Additionally, ongoing FDA enforcement of regulations requiring clerks to ask for identification may have an effect on Wyoming’s Synar violation rate.

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<sup>1</sup> Unweighted frequencies.

## *2016 Electronic Nicotine Delivery System (ENDS) Pilot Study*

The Wyoming Legislature and Governor added electronic nicotine delivery systems (ENDS) to the legal definition of tobacco products in the state's youth access law in 2013 (State of Wyoming, 2013, p. 2; 2016). In 2015, Wyoming high school students reported greater prevalence of using ENDS than U.S. high school students (Youth Risk Behavior Surveillance System [YRBSS], 2015), and ENDS use has been linked to greater risk for using combustible tobacco products (Leventhal et al., 2015). Because of this law and these dual concerns, the Wyoming Department of Health, Public Health Division, requested a pilot study to prepare for ENDS to be included in future Synar work and/or other work related to preventing youth access to ENDS.

The ENDS Pilot Study protocol had youth inspectors ask for the two products that are the national market leaders. Vape shops—retailers that focus on selling ENDS, often to the exclusion of selling traditional tobacco products—were not included in the ENDS Pilot Study. Inspection teams attempted 47 inspections but were only able to complete 17 inspections, generally because Synar-eligible retailers did not sell the ENDS products included in the Pilot Study protocol.

During the Synar inspections for cigarettes and smokeless tobacco, youth were trained to look for whether cigarettes, smokeless tobacco, and/or ENDS were accessible to customers without asking the clerk. Youth reported the location of ENDS in 107 out of the 232 sampled outlets (46.1%).<sup>2</sup> It is likely that a greater percentage of outlets carry ENDS, but youth did not see them or report their location.

Before integrating ENDS into official Synar work, WYSAC will need to improve the Synar retailer list to include information about what tobacco products are sold at which retailers. Future inspection teams can then use this information to improve the completion rate for ENDS buy attempts, which could then lead to an estimate of the state's violation rate for ENDS. WYSAC recommends continued pilot studies to improve the completion rate of ENDS inspections. Once the completion rate is comparable to that of the Synar inspections, the results of an ENDS Pilot Study can be used to determine an appropriate sample size for a study to estimate the violation rate for ENDS. Still, this preliminary evidence regarding the availability of ENDS suggests the need to include vape shops in work to prevent the sales of ENDS to minors.

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<sup>2</sup> Unweighted frequencies.

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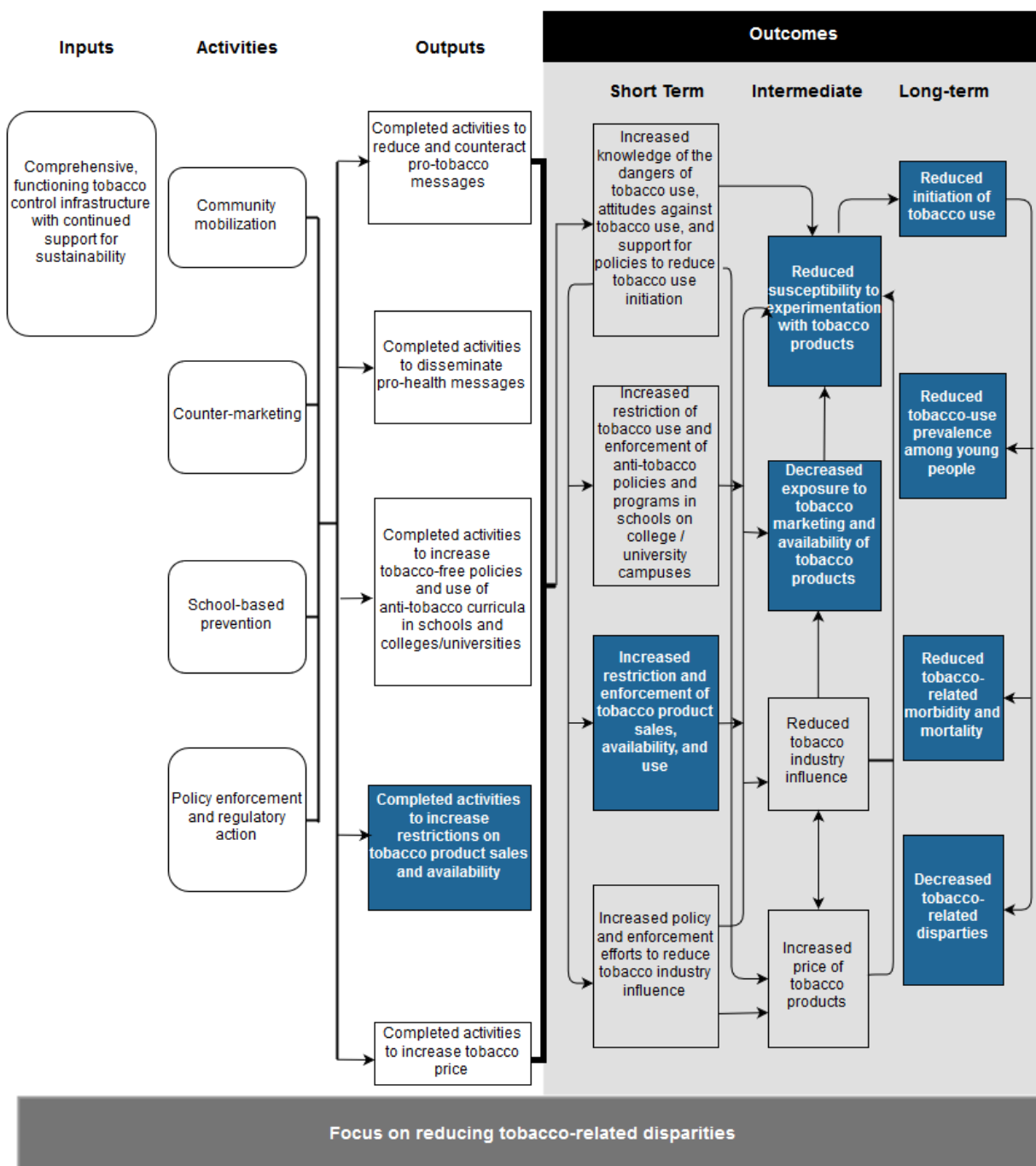
# Background and Evaluation Context

In 1992, the United States Congress enacted the Alcohol, Drug Abuse, and Mental Health Administration Reorganization Act, which includes an amendment (section 1926) aimed at decreasing youth access to tobacco. This amendment, named for its sponsor, former Representative Mike Synar (Democrat, Oklahoma), requires states to adopt and enforce state laws prohibiting the sale of tobacco to youth under the age of 18. To be in compliance, states must also conduct annual, random, and unannounced inspections to ensure compliance with the state law and develop a strategy for achieving a retailer violation rate (RVR) of less than 20.0% (Substance Abuse and Mental Health Services Administration [SAMHSA], 2010). Since 2003, the Wyoming Department of Health, Public Health Division, has contracted with the Wyoming Survey & Analysis Center (WYSAC) at the University of Wyoming to conduct Wyoming's annual Synar Inspection Study to assess tobacco retailers' compliance with the law.

WYSAC's Synar evaluation complements the evaluation of Wyoming's Tobacco Prevention and Control Program, which follows the Centers for Disease Control and Prevention (CDC) model. Specifically the CDC, Office of Smoking and Health (2014, p. 21) states, "activities to increase restrictions on tobacco product sales and availability" are key to reducing "availability of tobacco products" and "susceptibility to experimentation with tobacco products." As highlighted in Figure 1 (following page), such activities reduce the initiation of tobacco use, the prevalence of tobacco use among young people, and the morbidity and mortality that result from tobacco use. The Synar amendment and related monitoring of compliance with state laws against selling tobacco products to minors are key parts of tobacco prevention efforts nationally and in Wyoming.

**Figure 1: Synar Is Part of Evaluating a Comprehensive Tobacco Prevention and Control Program.**

*CDC Logic Model for Goal Area 1, Preventing Initiation of Tobacco Use*



Source: CDC, 2104, p. 21

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Electronic nicotine delivery systems (ENDS; also known as electronic cigarettes, e-cigarettes, e-cigs, vape-pens, and other names) are a developing public health concern in Wyoming and the nation as a new tobacco product. ENDS are battery powered devices that produce a vapor by heating a liquid instead of producing smoke from burning tobacco. Contents of the liquid vary across products, and some models allow for customized liquids. Youth use of ENDS is concerning because some research shows youth who have used ENDS are more likely to transition to use of combustible tobacco (Leventhal et al., 2015). Senate File 103 was a bill introduced to the Wyoming Legislature January 10, 2013, (and signed into law later that year) to add “electronic cigarettes” to the definition of “tobacco products” in legislation designed, in part, to prevent the sale of tobacco products to minors. The bill defines electronic cigarettes as “a product that employs any mechanical heating element, battery or electronic circuit, regardless of shape or size, that can be used to deliver doses of nicotine vapor by means of heating a liquid nicotine solution contained in a cartridge or other delivery system” (State of Wyoming, 2013, p. 2).

A greater percentage of Wyoming high school students (30%) report being current ENDS users when compared to the national estimate (24%). Additionally, about twice as many Wyoming high school students report current ENDS use as compared to current cigarette use (16%; Youth Risk Behavior Surveillance System [YRBSS], 2015).

The YRBSS only asked about ENDS use in 2015, making a trend analysis with that data impossible. Different data show a decrease in middle and high school students’ use of tobacco products like cigarettes that coincided with a rapid increase in ENDS use. Nationally, ENDS use by high school students increased from 2% in 2011 to 16% in 2015, becoming the most commonly used tobacco product in this age group (Singh, et al., 2016).

Because of the state law and concerns described above, the Wyoming Department of Health, Public Health Division, asked WYSAC to conduct a pilot study of retailer compliance with state law prohibiting the sale of ENDS to minors with a protocol similar to the Synar Inspection Study. The results of the 2016 ENDS Pilot Study can be used to establish a realistic protocol for ENDS buy attempts and identify obstacles to incorporating ENDS buy attempts into prevention work.

# Methods

This section includes descriptions of the sampling design, inspection teams, protocols, inspected stores, and analysis for the 2016 (FFY 2017) Synar Inspection Study and 2016 ENDS Pilot Study.

## *Sampling Design<sup>3</sup>*

### SYNAR INSPECTION STUDY

At the end of the 2015 (FFY 2016) Synar Inspection Study, WYSAC removed ineligible and closed stores from the tobacco retailer list. In the spring of 2016, WYSAC requested updates to this revised list from the county-based community prevention specialists (CPSs) working for the Prevention Management Organization of Wyoming (PMO).

WYSAC (2016) conducted the 2016 (FFY 2017) Synar Coverage Study in the spring and early summer of 2016. As part of the work for that study, WYSAC coverage teams identified Synar-eligible tobacco retailers that were not on the existing retailer list. WYSAC added these stores to the Synar retailer list. WYSAC also discovered a low coverage rate for rural retailers and took three key steps to address this low coverage rate: (a) incorporate publicly available results of the U. S. Food and Drug Administration (FDA; 2016a) tobacco compliance inspections, (b) incorporate data from the 2015 WASCOP tobacco compliance checks, and (c) purchase a low-cost list of convenience stores across the state, assuming that most would be eligible for the Synar Inspection Study. Before adding stores from these three sources to the Synar list, WYSAC eliminated retailers that were identified as liquor stores because those stores are not eligible for Synar. (They are legally inaccessible to unaccompanied minors.) WYSAC used this updated list of 670 stores for the 2016 (FFY 2017) tobacco retailer list frame for the Synar Inspection Study.

As in previous years, WYSAC categorized each tobacco retailer into one of two strata based on its location in either an urban town or a rural town. WYSAC defined urban towns as having a population of 3,000 or more and rural towns as having a population less than 3,000. The list frame had 477 stores in the urban stratum and 193 stores in the rural stratum. WYSAC used the Synar Survey Estimation System (SSES), Version 5.1,<sup>4</sup> to determine the sample size for each stratum. (See Appendix C.1 for more information about the sampling calculations and

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<sup>3</sup> Stores on federal land, such as national parks and Indian reservations are not inspected during the Synar Inspection Study. Stores in the towns of Moose and Moran Junction are considered to be in Grand Teton National Park. Stores in the towns of Burris, Crowheart, Ethete, Ft. Washakie, Hudson, St. Stephens, Arapahoe, Johnstown, and Boulder Flats are considered part of the Wind River Indian Reservation.

<sup>4</sup> Version 6.0 was not distributed to WYSAC until after the inspections had begun.

procedure.) WYSAC used a 20% safety margin for noncompletion, as recommended by SAMHSA (2011). SSES yielded a planned sample size of 94 for the urban stratum and a planned sample size of 138 for the rural stratum, resulting in a total planned sample of 232 stores. WYSAC drew a random sample for each stratum using IBM SPSS Statistics Version 22.

## ENDS PILOT STUDY

The protocol for Synar inspections is for one out of every three inspections to be for smokeless tobacco. WYSAC instructed inspection teams to follow every smokeless tobacco inspection with an ENDS inspection in the same store. This assured that attempted purchase for the Synar visit for the store occurred prior to trying to purchase an ENDS for the Pilot Study. Because the goal of the ENDS Pilot Study was to test the protocol, WYSAC did not conduct any formal assessment to determine a sample size. Instead, the goal was to provide a system that would ensure a rough balance of boy and girl inspectors conducting the ENDS inspections.

## *Inspection Teams*

The same inspection teams completed inspections for the 2016 (FFY 2017) Synar Inspection Study and 2016 ENDS Pilot Study. The 10 teams typically consisted of one adult supervisor/driver and two youth inspectors (one boy and one girl).<sup>5</sup> As required by the Wyoming Attorney General, a local law enforcement officer (from county sheriffs' offices and municipal police departments) was available for every inspection. Law enforcement officers did not accompany the youth inspectors into the stores or issue any citations for noncompliance. The role of the law enforcement officers was to ensure the safety of the inspection teams. WYSAC collaborated with the Wyoming Association of Sheriffs and Chiefs of Police (WASCOP) to identify and coordinate with local officials who had jurisdiction over the areas in which the teams conducted inspections.

WYSAC recruited three adults in the Laramie, Wyoming, area to be the adult supervisors. Prior to hiring the adult supervisors, the University of Wyoming conducted criminal background checks and reviewed the driving records of applicants. WYSAC trained all adult supervisors in the Synar Inspection Study and ENDS Pilot Study protocols. The adult supervisors were then responsible for training the youth inspectors.

As in previous years, WYSAC recruited youth inspectors primarily by asking previous inspectors to participate again (if they were still in the eligible age range) and/or to provide

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<sup>5</sup> For one trip, WYSAC was unable to recruit a youth of the other gender. This was for the only trip conducted in September, after early analyses showed that the first round of inspections had not met the target number of completions in the urban strata.

referrals. Additionally, WYSAC partnered with other organizations to identify youth contacts across the state. WYSAC contacted Wyoming 4-H, school officials across the state, and some of the CPSs to recruit potential youth inspectors. When needed, WYSAC asked the recruited youth for referrals. WYSAC contacted potential youth inspectors via telephone to describe the project and get verbal consent from one of their parents or guardians. Once the youth and the parent/guardian expressed interest, WYSAC sent them a written description of the project, a parent/guardian permission form, and hiring forms. WYSAC required completed parent permission forms before any youth could participate in the inspections.

## *Protocols*

The 2016 (FFY 2017) Synar inspections began on July 18 and ended on September 26. Much of the Synar Inspection Study and the ENDS Pilot Study protocols were identical. These shared elements follow, with subsequent sections providing additional details for each protocol.

All youth inspectors resided within the area they inspected, thereby eliminating the need for overnight stays by the youth inspectors. To maximize consistency across inspections, all youth inspectors followed a written script (see Appendix A) and role-played with the adult supervisors until they mastered the buying procedure. Adult supervisors also trained youth inspectors to observe and describe certain aspects of the stores and clerks (e.g., the location of tobacco products, including ENDS, and the approximate age of the clerks). Upon arriving at a store, one youth inspector (alternating between boys and girls) entered the store and, following the buyer script, attempted to purchase tobacco (cigarettes, smokeless tobacco, or ENDS).

When youth inspectors knew anyone in the store (including any employee or customer), they left the store without attempting a purchase. If the second youth inspector did not know anyone in the store, he or she would then enter the store and attempt the buy. If both youth inspectors knew someone in the store (e.g., the first youth identified a mutual acquaintance), the team returned later to reattempt the buy, schedule permitting.

Survey protocol required youth inspectors to leave their identification at home or in the car with the adult supervisors. This strategy allowed youth inspectors to answer honestly if a clerk asked for identification, saying, "I don't have it on me." Not providing identification during inspections safeguards youth privacy by not revealing their names or where they live. Youth inspectors were trained to answer honestly if asked their age.

The youth inspectors each carried \$1 in cash into each store, so they could not produce enough money to complete the purchase if a clerk was willing to sell the tobacco product. In accordance with protocol, no purchase attempts were consummated. The inspection was completed either

by a clerk's refusal to sell or by a violation indicated by the youth inspector ending the transaction (e.g., when the clerk stated the price of the product and waited for payment).

Immediately following each inspection, youth inspectors returned to the vehicle and verbally reported the details of the inspection to the adult supervisors, who then entered this information on a data form (see Appendix D). WYSAC collected the forms at the end of each inspection trip. The information reported on the form includes the following:

- Inspection date and time of day (morning or afternoon);
- Youth inspector name, age, and gender;
- Adult supervisor name;
- Store name and address (with corrections for the list frame as needed);
- Completion status of the inspection (ineligible store, eligible store that was not inspected, completed inspection);
- Store type;
- Location of tobacco products in the store (accessible or not for cigarettes, smokeless tobacco, and ENDS regardless of the tobacco type requested during the inspection);
- The presence of any visible youth access messages (e.g., "No Sales to Minors");
- Clerk gender and estimated age;
- Type and brand of tobacco product requested;
- Outcome of the buy attempt (violation, nonviolation, noncompletion);
- Clerks' stated price for the tobacco products (primarily for inspections that ended in a violation, though some youth noted the price they saw on the shelf); and
- Whether the clerk asked the youth inspector for identification or their age.

## SYNAR INSPECTION STUDY PROTOCOL

During most cigarette inspections, youth inspectors attempted to purchase Marlboro Gold cigarettes. When those were unavailable, girls attempted to purchase Camel Blues, and boys attempted to purchase Camels. One out of every three inspections was for smokeless tobacco. During smokeless tobacco inspections, the youth inspectors (regardless of gender) asked for Skoal Wintergreen long cut or Copenhagen Wintergreen long cut (when Skoal Wintergreen was unavailable). After each inspection, drivers completed the data form described above based on the youth report.

After discovering that the initial inspection trips did not net a sufficient number of completed inspections in the urban stratum, WYSAC scheduled an additional trip to conduct inspections at six retailers where the Synar Inspection Study buy attempt was not completed because both youth knew someone in the store. WYSAC selected these six stores based on relative proximity

to each other and availability of a youth inspector. Only two stores were visited because the youth inspector was too sick to work on one planned inspection day.

Adult supervisors photographed each youth inspector on their first day of inspections. When the inspections were complete, WYSAC asked 14 raters unfamiliar with the Synar project to estimate the age of each youth inspector. WYSAC then calculated the mean for the usable ratings for each youth to determine the age rating for each inspector. These ratings allowed WYSAC to statistically test for whether the youth inspectors who looked 18 or older made more successful purchase attempts (i.e., more violations). The average age rating of all youth inspectors was 18.6. The lowest age rating was 16.9, and the highest age rating was 20.5. Of the 18 youth inspectors, 12 had age ratings of 18 or older, and six had age ratings younger than 18. Because every youth inspector was and looked younger than 26, FDA regulations (FDA, 2010b) dictate that every youth inspector should have been asked for identification on every inspection. WYSAC did not use the youth age ratings in analysis of the ENDS Pilot Study results because of that study's purpose and small sample size.

## RECENT CHANGES TO SYNAR PROTOCOL

In 2010, the first year to include smokeless tobacco inspections, youth inspectors were not instructed to ask for a specific flavor or cut of tobacco. WYSAC added flavors and cut to the 2011 protocol to improve the realism of purchase attempts. WYSAC used data on popular brands, flavors, and cuts of tobacco (University of Medicine and Dentistry of New Jersey [UMDNJ]-School of Public Health, 2006) to choose the brands, flavor, and cut for the script. Also in 2011, WYSAC altered the script for cigarette inspections, which had previously had youth inspectors ask for Marlboro Lights or Camel Lights, to the replacement brands (Marlboro Golds and Camel Blues) introduced to the marketplace in response to the 2009 Family Smoking Prevention and Control Act prohibiting the use of the term light in branding cigarettes (FDA 2010a).

In 2012, WYSAC increased the frequency of the inspections for smokeless tobacco from one out of every five inspections (as it was in 2010 and 2011) to one out of every three inspections to allow for analyses of factors associated with violations during smokeless tobacco inspections. Because of these changes to protocol, WYSAC only makes general comparisons of results from before smokeless tobacco was added to the protocol and results from after smokeless tobacco was added to the protocol. Until 2012, WYSAC employed 15-year-olds as youth inspectors in addition to 16- and 17-year-old youth inspectors. In 2016, WYSAC updated the inspection form based on SAMHSA feedback, to ease data processing, and to accommodate the ENDS Pilot Study conducted with the Synar Inspection Study.

## ENDS PILOT STUDY PROTOCOL

VUSE and blu are the national market leaders for mass-produced ENDS sold in convenience stores (Vonder Haar, 2015). VUSE only sells kits (a battery, charger, and liquid cartridge that also serves as the mouthpiece) and refills for their kits. Blu offers disposable devices and refillable devices. The first author of this report visited several Synar-eligible retailers in Laramie and, based on visual inspection, determined that both brands were consistently available in Synar-eligible retailers. There was not a clear third-option for a brand of ENDS to include in the protocol. WYSAC developed a protocol for each brand.

For the VUSE protocol, youth asked for a berry-flavored refill. If this product was unavailable, youth would ask for a cherry-flavored blu disposable device. WYSAC thought asking for the relatively cheap, popular, disposable device would be a realistic alternative compared to purchasing a new, more expensive starter kit for VUSE or another brand. VUSE kits only come in tobacco and menthol flavors.

For blu inspections, youth asked for a cherry-flavored disposable device. In both protocols, youth were trained to accept alternative flavors (e.g., menthol) if offered by the clerk when berry or cherry were not available.

Inspection teams were instructed to follow-up every smokeless tobacco inspection with an ENDS tobacco inspection conducted by the other youth. Youth were allowed to enter stores at the same time if the driver felt that would not arouse suspicion. Drivers then completed the data form described above.

## *Inspected Stores*

### SYNAR INSPECTION STUDY STORES

Of the 232 stores in the sample, 35 were ineligible. These stores were ineligible for the following reasons: out of business (4), did not sell tobacco products (12), inaccessible by youth (10), could not be located (4), duplicate (4) and other (1): moved to inaccessible location. Thus, the total number of eligible stores was 197, 84.9% of the sample. Another 22 stores were coded as eligible but not inspected. These stores were coded as not inspected for the following reasons: in operation but closed at time of visit (1), unsafe to access (1), both youth inspectors knew a person in the store (6), and other (14): no support from law enforcement, (4) driver error<sup>6</sup> (6), and does not sell smokeless tobacco (4). WYSAC inspected and used data for 175 stores, or 88.8% of the eligible stores in the sample. Of these, 70 inspected stores were in the urban

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<sup>6</sup> When these omissions were discovered, none of the youth or drivers were available for the trip that would have been needed to complete the inspection.

stratum, and 105 inspected stores were in the rural stratum, meeting or exceeding the effective sample sizes for each strata.

## ENDS PILOT STUDY STORES

Inspection teams attempted 47 ENDS inspections (26 rural outlets and 21 urban outlets). Four of these stores were ineligible because they did not sell any tobacco products, and 23 (48.9%) were ineligible for the ENDS Pilot Study because they did not sell ENDS products. Thus, a total of 20 stores (42.6% of the sample) were eligible for ENDS inspection. Three of these stores were coded as eligible, incomplete because both youth knew the salesperson. WYSAC inspected and used data for 17 ENDS inspections, 85% of the eligible stores in the sample (36.2% of the total attempts).

## *Analysis*

To calculate most of the descriptive statistics reported in the section Inspected Stores (above) and the weighted RVR for the Synar Inspection Study, WYSAC used SSES Version 6.0, an add-in for Microsoft Excel. SAMHSA distributes and recommends use of this software to facilitate reporting of analyses by each state. WYSAC also used SSES to calculate most of the inspection completion numbers, the unweighted RVR, and the stratum-specific RVRs for the ENDS Pilot Study.

WYSAC conducted additional analyses in IBM SPSS Statistics version 23. For the Synar Inspection Study, WYSAC conducted crosstab analyses to identify variables associated with violations. Depending on the specific analysis, WYSAC used Pearson's chi-squared test or Fisher's exact test to identify statistically significant associations. Fisher's exact test is an alternative to Pearson's chi-squared test that provides more reliable results than Pearson's chi-squared in analyses when a crosstab only has a few observations in some of the conditions (e.g., no violations for cigarette inspections where cigarettes were accessible). As a general rule, Fisher's exact tests are preferred when more than 25% of conditions have fewer than five expected observations or when any condition has zero observations. In Appendix C.3, WYSAC reports which test was used for each reported association, along with detailed statistical results. In this report, WYSAC reports significant relationships when  $p < .05$ , suggesting that one can say with 95% confidence that the differences are not due to chance. In general, WYSAC accounts for the stratified sample by reporting weighted data (consistent with SSES). However, WYSAC occasionally reports unweighted counts for clarity (such as in the section Inspected Stores, Appendix B, and as noted in the text).

For the ENDS Inspection Study, WYSAC approached the analyses differently because the purpose of the study is to develop an inspection protocol and identify barriers to incorporating



ENDS into future Synar Inspection Studies and/or other prevention work. Additionally, because the number of ENDS retailers in each stratum of the population is unknown and was not used in sampling, WYSAC did not weight the data. Instead, WYSAC only reports overall (unweighted) descriptive statistics and strata-specific descriptive statistics obtained from SSES and SPSS.

## Key Findings

This section presents the key findings for the 2016 (FFY 2017) Synar Inspection Study and ENDS Pilot Study.

### *Synar Inspection Study*

This section details key findings from the 2016 (FFY 2017) Synar Inspection Study. Detailed statistical results (test statistics, degrees of freedom, weighted sample size, and p values) are in Appendix C.3.

WYSAC recruited 18 youth inspectors. The balance of inspections completed by each gender and each age met SAMHSA (2010) requirements. Nine girls completed 48.6% of the inspections; nine boys completed 51.4% of the inspections. Eight 16-year-olds completed 45.1% of the inspections, and ten 17-year-olds completed 54.9% of the inspections. See Table 1 for the detailed breakdown by age and gender.

**Table 1: Inspections Were Conducted Evenly by Youth Age and Gender**

*Percentage of Synar inspections completed by youth gender and age*

	Girls	Boys
16 years old	22.3%	22.9%
17 years old	26.3%	28.6%

Note: Percentages do not add to 100 because of rounding.

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The FFY 2017 (calendar year 2016) Synar RVR was 11.7%, with a standard error of 2.5%. The violation rate is below the 20% threshold, when accounting for the one-sided confidence interval, but WYSAC did not meet SAMHSA's precision requirement of a 3% or smaller margin of error for the one-sided 95% confidence interval (Table 2; SAMHSA, 2016). This margin of error was 4.1%. The RVR for cigarettes was 10.4%, compared to 14.6% for smokeless tobacco.

## Table 2: The FFY 2017 RVR Met the SAMHSA Requirement

*Table 1 from the Synar Survey Estimation System (SSES) output*

### CSAP-SYNAR REPORT

State	WY
Federal Fiscal Year (FFY)	2017
Date	10/15/2016 12:56
Data	2016 Synar SSES data WY complete.xlsx
Analysis Option	Stratified SRS with FPC

### Estimates

Unweighted Retailer Violation Rate	12.0%
Weighted Retailer Violation Rate	11.7%
Standard Error	2.5%
Is SAMHSA Precision Requirement met?	NO
Right-sided 95% Confidence Interval	[0.0%, 15.8%]
Two-sided 95% Confidence Interval	[6.8%, 16.6%]
Design Effect	1.1
Accuracy Rate (unweighted)	84.9%
Accuracy Rate (weighted)	83.9%
Completion Rate (unweighted)	88.8%

### Sample Size for Current Year

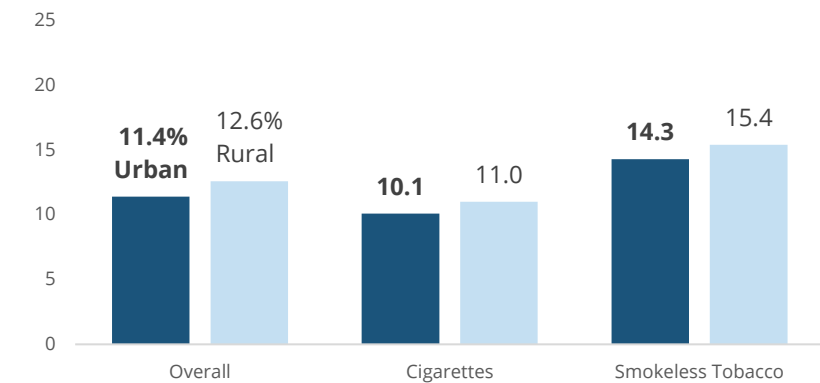
Effective Sample Size	170
Target (Minimum) Sample Size	170
Original Sample Size	232
Eligible Sample Size	197
Final Sample Size	175
Overall Sampling Rate	31.3%

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The type of tobacco (cigarettes or smokeless tobacco), dichotomized age of the clerks (as estimated by the youth, split evenly between clerks thought to be 35 or younger and 36 or older), the month of inspection (July, August, or September), the stratum (urban or rural), the store type (dichotomized as convenience store with or without gas vs. all other store types), and youth inspector gender (girl or boy) were not significantly associated with retailer violations. WYSAC generally does not provide further details for these results in the body of the report.

**Figure 2: RVRs Did Not Vary by Strata**

*Violation rates by strata and tobacco type*



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Figure 2 shows the violation rates by stratum and tobacco type because that is of key interest to SAMHSA. Because of Wyoming Department of Health, Public Health Division, interest, WYSAC reports violation rates broken down by tobacco type for most of this report.

## SIGNIFICANT ASSOCIATIONS WITH VIOLATION

### Generally Significant Predictors of Violation across Tobacco Types

Three factors were associated with violations when considering all inspections, for cigarette inspections, and for smokeless tobacco inspections: clerks not asking for identification, the adult supervisor leading the trip, and the youth having an apparent age of 18 or older. A fourth, highly related factor, was statistically significant when considering all inspections and for cigarette inspections, but not for smokeless tobacco inspections: youth age.

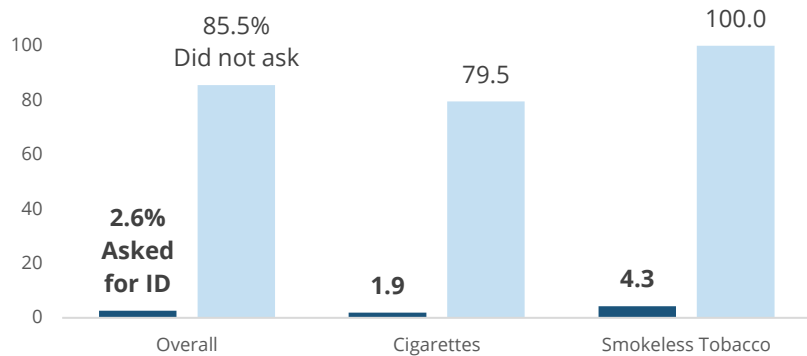
As it has been since 2007 (WYSAC 2015), clerks not asking for identification was the strongest predictor of violations. Figure 3 shows details for weighted violation rates (overall, for cigarette inspections, and for smokeless tobacco inspections) by whether the clerk asked for identification. Overall, the odds of a clerk violating when not asking for identification were 226.8 times higher than when asking for identification.

Only three clerks (two cigarette inspections and one smokeless tobacco inspection)<sup>7</sup> asked for identification and then committed a violation by being willing to sell the tobacco product.

One of the three drivers demonstrated a higher retailer violation rate (18.3%) than the other two drivers (6.5% and 7.7%). Upon further investigation into the relatively high RVR for the year (see Exploring the High RVR), it seems that this driver's high RVR was due to a trip that had an exceptionally high RVR (51.2%) rather than a systematic difference across the three trips she led.

**Figure 3: Asking for Identification Prevents Violations**

*Violation rates by clerks asking for identification or not and by tobacco type*



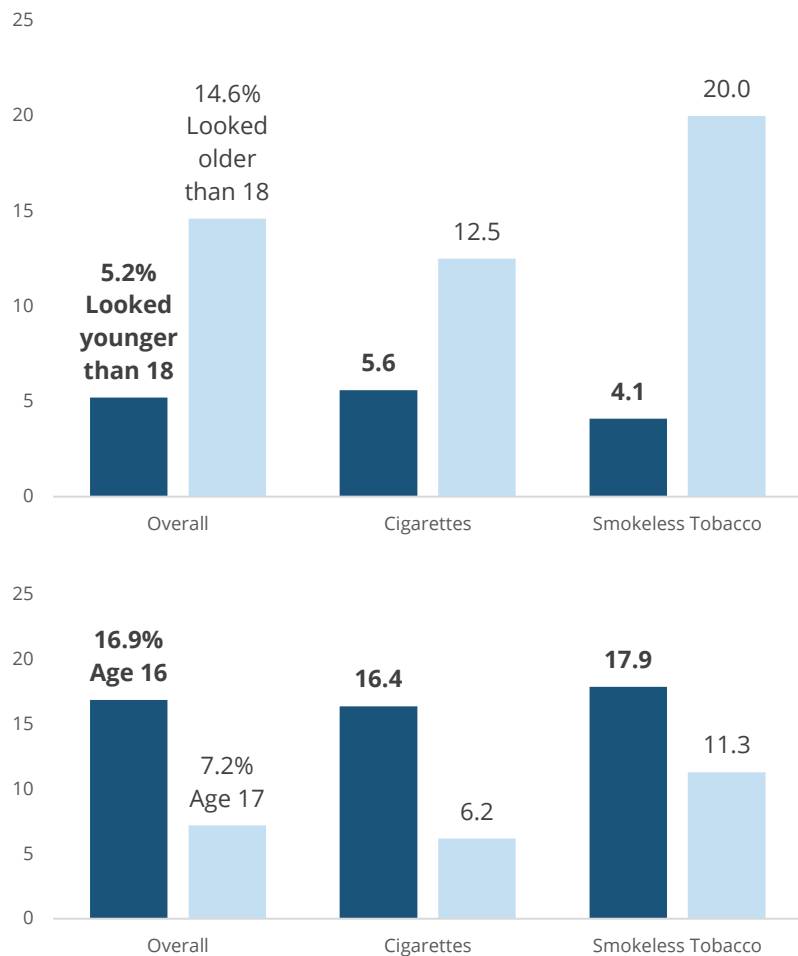
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<sup>7</sup> Unweighted frequencies.

The perceived and actual ages of the youth inspectors were also key predictors of violations (except for actual age during smokeless tobacco inspections). For the average age rating (based on 14 raters looking at photographs of the youth), the relationship was intuitive: youth who looked 18 or older had a higher violation rate. For actual age, the relationship was counter-intuitive, with younger inspectors having a higher violation rate (Figure 4).

#### Figure 4: Actual Age and Age Ratings Associated with Violations

*Results differed by age, perceived age, and tobacco type*



Note: The differences in RVR by age rating were statistically significant for all types of tobacco. The differences in RVR by age were statistically significant overall, and for cigarette inspections, but not smokeless tobacco inspections.

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## Significant Predictors for a Single Inspection Category

The accessibility of tobacco products, based on youth reports of whether they could pick up a tobacco product (pack of cigarettes, container of smokeless tobacco, or ENDS) was associated with the overall violation rate.

However, when WYSAC took a focused approach (accessibility of cigarettes for cigarette inspections and accessibility of smokeless tobacco for those inspections), the relationship was not significant (Table 3).

The absence of signs regarding youth access to tobacco products (e.g., We Card) was only significantly associated with violations during cigarette inspections. The absence of these signs was associated with a higher RVR (Table 4).

### Table 4: Cigarette RVR Was High When Youth Access Signs Were Absent

*RVR by presence of youth access signs and tobacco type*

	Overall	Cigarettes*	Smokeless tobacco
Signs	10.9%	9.0%	15.1%
No signs	16.1%	17.3%	15.4%

Note: Signs would include We Card and other signs about youth access to tobacco products.

\*Statistically significant difference.

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### Table 3: Overall RVR Was High When Tobacco Products, Including ENDS, Were Accessible

*RVR by tobacco accessibility and tobacco type*

	Overall*	Cigarettes	Smokeless tobacco
Accessible	25%	0.0%	0.0%
Not accessible	7.2%	10.7%	14.7%

Note: Overall accessibility includes cigarettes, smokeless tobacco, and ENDS. For cigarettes and smokeless tobacco, accessibility is specific to tobacco type.

\*Statistically significant difference.

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Clerks asking the inspector for their age was only associated with violations for smokeless tobacco inspections. Clerks not asking was associated with a higher RVR (Table 5).

### Table 5: Smokeless Tobacco RVR Was High When Clerk Did Not Ask the Youth's Age

*RVR by asking for age and tobacco type*

	Overall	Cigarettes	Smokeless tobacco*
Asked youth's age	3.8%	6.7%	0.0%
Did not ask youth's age	12.4%	10.5%	17.0%

\*Statistically significant difference.

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Clerk gender was only associated with violations for smokeless tobacco inspections. Men were more likely to commit a violation (Table 6).

**Table 6: Smokeless Tobacco RVR  
Was High for Clerks Who Were Men**

*RVR by clerk gender and tobacco type*

	Overall	Cigarettes	Smokeless tobacco*
Man	15.8%	12.3%	29.2%
Woman	10.4%	9.7%	11.9%

\*Statistically significant difference.

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Time of inspection was only associated with violations for smokeless tobacco inspections. Inspections conducted in the afternoon had a higher RVR (Table 7).

**Table 7: Smokeless Tobacco RVR  
Was High for Afternoon Inspections**

*RVR by time of day and tobacco type*

	Overall	Cigarettes	Smokeless tobacco*
Morning	8.5%	11.3%	3.4%
Afternoon	13.1%	10.4%	21.8%

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## EXPLORING THE HIGH RVR

The 2016 (FFY 2017) RVR was the second-highest RVR since implementing inspections for smokeless tobacco in 2010 (Figure 5).

For the FFY 2013 inspections, WYSAC (2012) was able to determine that the abnormally high statewide violation rate was the result of a single trip that had a high violation rate.

Hypothesizing that it might be again possible to isolate the reason for the high statewide violation rate in

2016, WYSAC conducted follow-up analysis on the

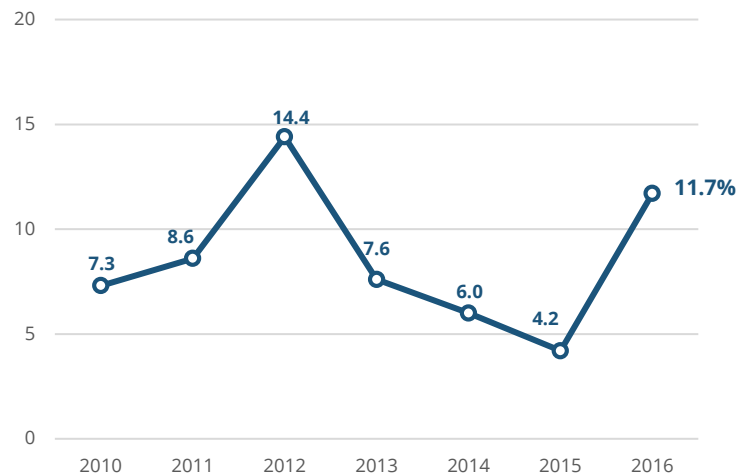
2016 data. WYSAC identified two out of the 10 trips that had unusually high violation rates (based on adjusted standardized residuals in a Pearson's chi-squared analysis). One trip had a violation rate of 51.2%, and the other had a violation rate of 20.3%. Different drivers supervised each high RVR trip, and each of these drivers had supervised a similar percentage of inspections (40.9% vs. 34.5%). Thus, there is limited evidence to attribute the high statewide violation rate to the drivers, though it is possible that the drivers did something different during these specific trips compared to the other trips they led.

Next, WYSAC examined the data for the youth involved in each of these two high RVR trips (Trips 1 and 6). For Trip 1, which had a violation rate of 20.3%, one youth, a boy, had a violation rate of 0%. He completed nine inspections.<sup>8</sup> The other youth, a girl, had a violation rate of 42.9%. She completed 10 inspections.<sup>8</sup> She was 17 years old, but her average apparent age rating was 19.1 years old. The driver for that trip said she looked "20" years old but did not recall any other distinguishing features that might account for a high violation rate.

For Trip 6, which had a violation rate of 51.2%, both youth had high violation rates (53.3% for the girl and 50.0% for the boy). The 16-year-old girl had an apparent age rating of 19.1, and the

**Figure 5: Calendar Year 2016 (FFY 2017) RVR Unusually High**

*Synar RVRs since implementing smokeless tobacco inspections*



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<sup>8</sup> Unweighted frequency.



16-year-old boy had an apparent age rating of 18.1. The driver did not recall any other distinguishing features of either youth that that might account for a high violation rate.

## *ENDS Pilot Study Results*

Overall, inspection teams were able to complete 17 out of 47 attempted inspections, 36.2% of the attempts. Eight (47.1%) of these inspections were for disposable ENDS products; nine (52.9%) were for ENDS refill cartridges. One of the inspections for a disposable product did not have a specific brand on the data form.

Eight girls (four 16-year-olds and four 17-year-olds) and six boys (four 16-year-olds and two 17-year-olds) completed the ENDS inspections. This is slightly fewer than the number of total inspectors because of the low completion rate for the ENDS Pilot Study.

Teams attempted a total of 21 inspections in urban areas. They completed 10 inspections in 19 Synar-eligible retailers, a 52.6% completion rate.

Teams attempted a total of 26 inspections in rural areas. They were only able to complete inspections in seven out of 24 Synar-eligible retailers, a 29.2% completion rate.

Completion rates were better when excluding retailers that were not eligible for the ENDS Pilot Study: 10 of 12 (83.3%) urban outlets and seven of nine (77.8%) rural outlets. These final rates compare to an overall completion rate of 90.7% (89.7% for the urban strata and 88.2% for the rural strata) for the Synar Inspection Study.

During the Synar inspections for cigarettes and smokeless tobacco, youth were trained to look for whether cigarettes, smokeless tobacco, and/or ENDS were accessible to customers without asking the clerk. This protocol also serves as a visual inspection for the presence of ENDS in Synar-eligible retailers. Although the transaction for a Synar inspection may not allow minors sufficient time for a thorough visual inspection of the retail outlet, especially for relatively novel ENDS, the results of those visual inspections provide supporting evidence for the lack of ENDS availability in Synar-eligible retailers across Wyoming. Youth reported the location of ENDS in 107 (including five outlets that did not have usable data for the Synar inspections) out of the 232 sampled outlets (46.1%). It is likely that a greater percentage of outlets carry ENDS, and youth did not see them or report their location. Although the relationship was not statistically significant, youth were somewhat more likely to locate ENDS in convenience stores (68.2% of convenience stores) than in the other types of outlets (31.8% of all other outlets).

The unweighted violation rate of 11.8% for the 17 completed ENDS inspections was roughly comparable to the 12.0% unweighted violation rate for cigarettes and smokeless tobacco,

combined. Within the urban stratum, one of the 10 (10.0%) completed inspections resulted in a violation. In the rural stratum, one of the seven (14.3%) inspections resulted in a violation.

# Conclusions and Recommendations

## *Synar Inspection Study*

The FFY 2017 (calendar year 2016) Synar RVR was 11.7%. The violation rate is below the 20% threshold, when accounting for the one-sided confidence interval, but WYSAC did not meet SAMHSA's precision requirement of a 3% or smaller margin of error for the one-sided 95% confidence interval (SAMHSA, 2016). This margin of error was 4.1%. The fact that the RVR was much higher than estimated when calculating the sample size is the key factor in explaining the relatively high margin of error. WYSAC satisfied SAMHSA requirements of having a balance of inspections completed by youth of each gender and youth of each age (16 or 17).

WYSAC encountered a key difficulty in completing the 2016 Synar Inspection Study. Because of adding retailers to the list frame in response to a low rural coverage rate (WYSAC, 2016) and calculating a sample size based on a year with a low violation rate, it was difficult to meet the stratum-specific sample size targets. Further improvements to the list frame, especially identifying more ineligible outlets and removing them before the 2017 Synar Inspection Study, should reduce the likelihood of this problem in the future. The relatively high violation rate, combined with a relatively low completion rate, will result in a larger than normal sample size for the 2017 Synar Inspection Study.

The results of the 2012 and 2016 Synar Inspection Studies may reveal growing volatility in the Synar RVR. Two of the most recent five years show spikes in the RVR not accounted for by changes in prevention programming. Therefore, it may be worth considering altering the method used to calculate the sample size for future Synar inspections. One option to consider, with guidance from SAMHSA, would be to use a running average of the violation, completion, and accuracy rates to calculate the sample size targets. This would bring greater stability to sample sizes from year to year, which may reduce the volatility in RVR than can result from the relatively small sample sizes following a year with a low RVR.

WYSAC was able to isolate two of the 10 trips as the key factors in the high overall RVR. For one of these trips, WYSAC was able to further isolate the high violation rate to one youth. For the other trip, the two youth had similar violation rates. The fact that two of these three youth

were 16 years old likely explains the counterintuitive relationship between inspector age and violations, where younger youth had a higher violation rate. The protocol used for the Synar Inspection Study does not allow WYSAC to determine whether the high violation rates for the two trips were because of youth characteristics (e.g., coming across as older because of a mix of appearance and confidence during the inspections), differences in driver training of the youth for those specific trips (though no driver had more than one trip with an anomalously high RVR), or geographical factors (e.g., potential regional differences in law enforcement or FDA enforcement activity).

## *ENDS Pilot Study*

The overall and within-stratum completion rates were lower for the ENDS Pilot Study than for the Synar Inspection Study, but the violation rates were roughly similar. Therefore, the poor completion rate is the greatest concern when considering adding ENDS inspections to future Synar Inspection Studies. The sample size drawn would have to be increased to account for the lower anticipated completion rate, increasing the cost of the Synar Inspection Study. The ENDS inspection completion rate could be improved by improved tracking of which retailers on the Synar list frame sell which tobacco products and allowing drivers to ensure that youth attempt to purchase a tobacco product sold at each retailer. WYSAC has used the results from the 2016 (FFY 2017) Synar Inspection Study and ENDS Pilot Study to begin making these improvements to the list frame. This information could also be used to stratify by product type, should that approach prove desirable or if SAMHSA requires that approach.

However, such efforts would still be limited by the apparently low percentage of Synar-eligible retailers who sell ENDS. The overall completion rate for the ENDS Pilot Study and youth reports about the location of ENDS during the Synar Inspection Study suggest that roughly half of Synar-eligible retailers in Wyoming may not offer the products at all.

Expanding the buy attempt protocol to include more ENDS products (e.g., Logic, MarkTen) may improve the completion rate. However, this may reduce the realism of the buy attempt protocol.

WYSAC recommends continued testing of protocols to conduct inspections for ENDS with a focus on improving the completion rate. To continue with this testing, WYSAC will work to improve the list frame's coverage and identification of Synar-eligible ENDS retailers. This task will be complicated by possible changes to the market in response to FDA regulations implemented over the next three years (Madhani, 2016). Therefore, WYSAC recommends against including ENDS inspections in official Synar work until at least the 2019 (FFY 2020) Synar Coverage and Inspection Studies.

Although they were not included in the 2016 ENDS Pilot Study, retailers that exclusively sell ENDS (vape shops) warrant special consideration. Many may be ineligible for Synar inspections because they do not allow unaccompanied minors to enter, suggesting that adding eligible vape shops to the Synar list frame may have minimal impact on completion or violation rates. Another concern, unverifiable by current Wyoming data, is that youth may be more likely to use the more advanced ENDS products available at vape shops than the mass-produced products available at stores on the Synar list frame. Finally, because FDA regulations treat them as retailers and manufacturers (FDA, 2016b), there is greater concern about the possible effects of FDA regulation on the number of vape shops that will remain in business as regulations come into effect (Madhani, 2016). Therefore, WYSAC recommends monitoring the vape shop market in Wyoming without adding them to future ENDS Pilot Studies, Synar Coverage Studies, or Synar Inspection Studies until the market has stabilized. At that point, a realistic protocol for buy attempts in eligible vape shops in Wyoming could be developed and tested.

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# Appendices

## *Appendix A. 2016 (FFY 2017) Synar Inspection Study and ENDS Pilot Study Script*

The adult supervisors trained the youth inspectors to follow the protocol below.

### **Script and instructions:**

Please practice this script with your supervisor until you feel comfortable attempting your first purchase.

**In two out of three inspections, you will ask for cigarettes. Before you go into the store, your supervisor will let you know what to ask for. If you're asking for cigarettes, follow this script:**

*If the cigarettes are within reach:*

Select a pack of Marlboro Golds and place it on the counter.

*If the cigarettes are behind the counter:*

Say: "I'd like a pack of Marlboro Golds."

*If the store does not have Marlboro Golds:*

Young women pick up a pack of Camel Blues or ask: "How about a pack of Camel Blues?"

Young men pick up a pack of Camels or ask: "How about a pack of Camels?"

*If the store has none of these options:*

Say: "Then whatever you've got."

*If the clerk asks for ID:*

Say: "I don't have any ID with me."

*If the clerk asks your age:*

Be truthful in telling your age.

*If the clerk asks who the tobacco is for:*



Say: "For me."

*If the clerk refuses to sell (they might say something like, "Sorry, I can't sell that to you."):*

Leave the store.

*If the clerk offers to sell (they ring up the purchase and wait for your money):*

Fumble in your pocket and produce only one dollar, then say, "I don't have enough money, never mind," or "Sorry, I thought this was a \$10 bill," then leave the store.

*If another customer offers to buy the cigarettes for you:*

Say: "No, thank you," then leave the store.

**For every third inspection, you will ask for smokeless tobacco (chew), instead of cigarettes. Before you go into the store, your supervisor will let you know what to ask for. If you're asking for smokeless tobacco, follow this script:**

*If the smokeless tobacco is within reach:*

Select a can of Skoal Wintergreen and place it on the counter.

*If the smokeless tobacco is behind the counter:*

Say: "I'd like a can of Skoal Wintergreen."

*If the store does not have Skoal:*

Pick up a can of Copenhagen Wintergreen or ask, "How about a can of Copenhagen Wintergreen?"

*For either brand, if the clerk asks what cut you want (likely a choice between long cut and fine cut)"*

Say: "Long cut."

*If the store has none of these options:*

Say: "Then whatever you've got."

*If the clerk asks for ID:*

Say: "I don't have any ID with me."

*If the clerk asks your age:*

Be truthful in telling your age.

*If the clerk asks who the tobacco is for:*

Say: "For me."

*If the clerk refuses to sell (they might say something like, "Sorry, I can't sell that to you.):*

Leave the store.

*If the clerk offers to sell (they ring up the purchase and wait for your money):*

Fumble in your pocket and produce only one dollar, then say, "I don't have enough money, never mind," or "Sorry, I thought this was a \$10 bill," then leave the store.

*If another customer offers to buy the chew for you:*

Say: "No, thank you," then leave the store.

**After every smokeless tobacco inspection, the other youth will ask for an e-cigarette or vapor product. Before you go into the store, your supervisor will let you know what to ask for. If you're asking for a disposable e-cigarette, follow this script: Note: You are asking for devices, not the refill packs.**

*If the e-cigarettes are within reach:*

Pick up a blu disposable cherry flavor and place it on the counter.

*If the e-cigarettes are behind the counter:*

Say: "I'd like a blu cherry."

*If the store does not have blu cherry: accept an offer of blu menthol or ask for the menthol. If neither is an option,*

Pick up a VUSE Solo menthol flavor kit or ask "How about VUSE menthol?" (If needed, ask for the Solo VUSE.

*If the store sells e-cigarettes but has none of these options: and the clerk offers you an alternative brand or product, ask for the first one they offer. Otherwise, say "Thank you" and leave the store.*

*If the store does not sell e-cigarettes, even if it sells refill liquid, say "thank you" and leave the store.*

*If the clerk asks for ID:*

Say: "I don't have any ID with me."

*If the clerk asks your age:*

Be truthful in telling your age.

*If the clerk asks who the product is for:*

Say: "For me."

*If the clerk refuses to sell (they might say something like, "Sorry, I can't sell that to you."):*

Leave the store.

*If the clerk offers to sell (they ring up the purchase and wait for your money):*

Fumble in your pocket and produce only one dollar, then say, "I don't have enough money, never mind," or "Sorry, I thought this was a \$20 bill," then leave the store.

*If another customer offers to buy the product for you:*

Say: "No, thank you," then leave the store.

**After every smokeless tobacco inspection, the other youth will ask for an e-cigarette or vapor product. Before you go into the store, your supervisor will let you know what to ask for. If you're asking for a refill, follow this script:**

*If the e-juice is within reach:*

Select a berry flavor VUSE Solo refill and place it on the counter.

*If the e-juice is behind the counter:*

Say: "I'd like a berry refill for a VUSE Solo."

*If the store does not have berry refills for VUSE Solo:*

*If the store sells e-juice for VUSE Solo but not berry:*

Accept the first alternative flavor the clerk offers or ask: "What flavors do you have?" accept an offer of a mint, crema, chai, or menthol. As a last resort, accept an offer of a tobacco flavor.

*If the clerk offers you a new VUSE Solo kit instead of e-juice,*

Pick up a blu disposable cherry or ask: "How about a disposable blu cherry?"

*If the store does not sell VUSE e-juice or blu disposable e-cigarettes, even if it sells other brands, say thank you and leave the store.*

*If the clerk asks for ID:*

Say: "I don't have any ID with me."

*If the clerk asks your age:*

Be truthful in telling your age.

*If the clerk asks who the product is for:*

Say: "For me."

*If the clerk refuses to sell (they might say something like, "Sorry, I can't sell that to you.):*

Leave the store.

*If the clerk offers to sell (they ring up the purchase and wait for your money):*

Fumble in your pocket and produce only one dollar, then say, "I don't have enough money, never mind," or "Sorry, I thought this was a \$10 bill," then leave the store.

*If another customer offers to buy the product for you:*

Say: "No, thank you," then leave the store.

If you have any additional questions concerning the research study, please contact the Principal Investigator, Laran Despain, at (307) 766-2342 or [LDespain@uwyo.edu](mailto:LDespain@uwyo.edu).

## *Appendix B. 2016 (FFY 2017) Synar Inspection and ENDS Pilot Study Detailed Results*

WYSAC provides frequencies and percentages for every question on the 2016 (FFY 2017) Synar Inspection Form in this appendix. Results are separated by the Synar Inspection Study and ENDS Pilot Study. Because of rounding, not all percentages add to 100.0%. Reported percentages in this appendix may differ from those reported in the body of the report because analyses in the body of the report omitted outlets with missing data on specific items. For example, if a youth inspector did not report the location of cigarettes, it is treated as missing data in this appendix and was not included in the analysis testing for an association between accessibility of tobacco products and violation. For missing data, WYSAC provides unweighted frequencies in the tables below.

### **SYNAR INSPECTION STUDY**

For every question on the 2016 (FFY 2017) Synar Inspection Form, WYSAC provides the unweighted frequencies, unweighted percentages, and weighted percentages (except items 7 and 8, which ask about eligibility and inspection status, respectively) in this appendix. Of the 232 outlets in the sample, 197 were *eligible* (see items 7 and 7a). Another 22 outlets were coded as eligible, but *not inspected* (see items 8 and 8a). Thus, WYSAC has a total of 175 inspected outlets for inclusion in analyses. For every question (except for 7 and 8), WYSAC only reports information for the 175 stores included in the analyses. For questions 7 and 8, WYSAC provides information on all 232 stores in the sample and does not provide weighted percentages because part of the weighting accounts for ineligible outlets and incomplete inspections.

## 1: Inspection month

	Frequency	Valid, unweighted percent	Valid, weighted percent
July	89	50.9	53.3
August	85	48.6	45.7
September	1	0.6	1.0
Valid total	175	100.0	100.0

WYOMING SURVEY & ANALYSIS CENTER

## 2: Time of visit

	Frequency	Valid, unweighted percent	Valid, weighted percent
AM	52	29.7	29.1
PM	123	70.3	70.9
Total	175	100.0	100.0

WYOMING SURVEY & ANALYSIS CENTER

## 3: Gender of youth inspector

	Frequency	Valid, unweighted percent	Valid, weighted percent
Boy	90	51.4	52.9
Girl	85	48.6	47.1
Valid total	175	100.0	100.0

WYOMING SURVEY & ANALYSIS CENTER

## 4: Age of youth inspector

	Frequency	Valid, unweighted percent	Valid, weighted percent
Stores inspected by 16-year-olds	79	45.1	45.4
Stores inspected by 17-year-olds	96	54.9	54.6
Valid total	175	100.0	100.0

WYOMING SURVEY & ANALYSIS CENTER

## 5: Outlet Stratum

	Frequency	Valid, unweighted percent	Valid, weighted percent
Rural	105	60.0	29.6
Urban	70	40.0	70.4
Valid total	175	100.0	100.0

WYOMING SURVEY & ANALYSIS CENTER

## 6: Outlet county

	Frequency	Valid, unweighted percent	Valid, weighted percent
Albany	8	4.6	5.2
Big Horn	8	4.6	2.3
Campbell	8	4.6	7.3
Carbon	14	8.0	7.6
Converse	3	1.7	0.8
Crook	10	5.7	2.8
Fremont	14	8.0	7.6
Goshen	8	4.6	6.6
Hot Springs	4	2.3	1.1
Johnson	2	1.1	2.0
Laramie	12	6.9	9.9
Lincoln	16	9.1	4.5
Natrona	11	6.3	8.2
Niobrara	2	1.1	0.6
Park	2	1.1	2.0
Platte	5	2.9	2.1
Sheridan	4	2.3	2.6
Sublette	9	5.1	2.5
Sweetwater	16	9.1	11.7
Teton	8	4.6	5.9
Uinta	8	4.6	5.2
Washakie	2	1.1	1.3
Weston	1	0.6	0.3
Valid total	175	100.0	100.0

WYOMING SURVEY & ANALYSIS CENTER



## 7: Was the outlet (store) eligible for inspection?

	Frequency	Valid, unweighted percent
Yes	197	84.9
No	35	15.1
Valid total	232	100.0

Note: Includes all tobacco retailers in the sample, unlike the majority of tables in this appendix.

WYOMING SURVEY & ANALYSIS CENTER

### 7a: If NO, mark one of the following reasons the store was ineligible for inspection:

	Frequency	Valid, unweighted percent
Inaccessible to youth	10	28.6
Out of business	4	11.4
Does not sell tobacco products	12	34.3
Could not locate	4	11.4
Duplicate	4	11.4
Other (specify)	1	2.9
Valid total	35	100.0

Note. Includes only the 35 ineligible tobacco retailers from item 6, unlike the majority of tables in this appendix.

Other reason:

— Moved to inaccessible location (1)

WYOMING SURVEY & ANALYSIS CENTER

## 8: If outlet is eligible, was inspection completed?

	Frequency	Valid, unweighted percent
Yes	175	88.8
No	22	11.2
Valid total	197	100.0
Ineligible	35	NA
Total	232	NA

Note. Includes all tobacco retailers in the sample, unlike the majority of tables in this appendix.

WYOMING SURVEY & ANALYSIS CENTER

### 8a: If NO, mark one of the following reasons the inspection was not completed:

	Frequency	Valid, unweighted percent
In operation, but closed at time of visit	1	4.5
Both youth inspectors knew someone in the store	6	27.3
Unsafe to access	1	4.5
Other (specify)	14	63.6
Valid total	22	100.0

Note. Includes only the 22 uninspected, eligible tobacco retailers from item 7.

Other reasons:

- Lack of law enforcement support (4)
- Doesn't sell chew (4)
- Driver error (6)

WYOMING SURVEY & ANALYSIS CENTER

## 9: Type of store

	Frequency	Valid, unweighted percent	Valid, weighted percent
Convenience (no gas)	17	9.7	5.5
Convenience (with gas)	103	58.9	60.2
Grocery store	26	14.9	13.8
Discount/ Superstore (e.g., Wal-Mart, Target)	14	8.0	10.5
Tobacco store	1	.6	1.0
Restaurant / Cafe	2	1.1	0.6
Other (specify):	12	6.9	8.5
Total	175	100.0	100.0

“Other” responses:

- Bar (1)
- Bar / liquor store (1)
- Cabin rental / convenience (1)
- Cabin rental store (1)
- Country Club (1)
- Fireworks & Convenience store (1)
- Golf Resort (1)
- Liquor Store (1)
- Motel / restaurant (1)
- Ranch store (1)
- Resort (1)
- Trading post (1)

WYSAC included stores that were labeled as ineligible types of retailers (e.g., liquor store) under the assumption that the subjective store type became clear after the inspection or the retailer was some combination of an eligible type and ineligible type.

WYOMING SURVEY & ANALYSIS CENTER

## 10: Location of cigarettes

	Frequency	Valid, unweighted percent	Valid, weighted percent
Accessible (customers can pick up a pack of cigarettes without the assistance of an employee)	2	1.1	0.6
Not accessible (customers require assistance from an employee to obtain cigarettes)	173	98.9	99.4
Total	175	100.0	100.0

WYOMING SURVEY & ANALYSIS CENTER

## 11: Location of smokeless tobacco

	Frequency	Valid, unweighted percent	Valid, weighted percent
Accessible (customers can pick up a package of smokeless tobacco without the assistance of an employee)	5	2.9	2.2
Not accessible (customers require assistance from an employee to obtain smokeless tobacco)	165	97.1	97.8
Valid total	170	100.0	100.0
Youth inspector could not locate	5		
Total	175		

WYOMING SURVEY & ANALYSIS CENTER

## 12: Location of vapor products [ENDS]

	Frequency	Valid, unweighted percent	Valid, weighted percent
Accessible (customers can pick up ENDS without the assistance of an employee)	3	2.9	3.2
Not accessible (customers require assistance from an employee to obtain ENDS)	99	97.1	96.8
Valid total	102	100.0	100.0
Youth inspector could not locate	72		
Total	175		

WYOMING SURVEY & ANALYSIS CENTER

## Overall tobacco accessibility

WYSAC constructed this variable from responses to items 10 through 12 above.

	Frequency	Valid, unweighted percent	Valid, weighted percent
Cigarettes and/or smokeless tobacco and/or ENDS accessible (customers can pick up at least one type of tobacco product without the assistance of an employee)	7	6.8	5.8
No cigarettes, smokeless tobacco, or ENDS accessible (customers require assistance from an employee to obtain all types of tobacco products)	96	93.2	94.2
Valid Total	103	100.0	100.0
Missing data (youth inspector could not locate or no answer)	72		
Total	175		

Note. Youth inspectors asked for a specific type of tobacco product (cigarettes, smokeless tobacco, or ENDS) and were trained to look for the other types of tobacco product during each inspection, though they were not always able to see displays for all tobacco types. For example, a youth may not have noticed an ENDS display during a cigarette inspection if it was out of their line of site during a quick transaction. In such cases, “youth inspector could not locate” would not be a valid indicator of that product’s accessibility in that retailer, so WYSAC treats that response as missing.

WYOMING SURVEY & ANALYSIS CENTER

### 13: Were there any youth access signs present in the store (e.g., “No Sales to Minors”)?

	Frequency	Valid, unweighted percent	Valid, weighted percent
Yes	133	76.4	83.3
No	41	23.6	16.7
Valid Total	174	100.0	100.0
No Answer	1		
Total	175		

WYOMING SURVEY & ANALYSIS CENTER

### 14: Clerk gender

	Frequency	Valid, unweighted percent	Valid, weighted percent
Man	44	25.1	24.7
Woman	131	74.9	75.3
Total	175	100.0	100.0

WYOMING SURVEY & ANALYSIS CENTER

### 15: Approximate age of clerk

	Frequency	Valid, unweighted percent	Valid, weighted percent
18-24	23	13.1	15.2
25-34	46	26.3	29.6
35-44	38	21.7	19.4
45-54	35	20.0	20.0
55-64	20	11.4	8.5
65-85	13	7.4	7.3
Valid total	175	100.0	100.0

WYOMING SURVEY & ANALYSIS CENTER

### 16: If inspection was completed, was buy attempt successful?

	Frequency	Valid, unweighted percent	Valid, weighted percent
Yes (violation)	21	12.0	88.3
No (nonviolation)	154	88.0	11.7
Valid total	175	100.0	100.0

WYOMING SURVEY & ANALYSIS CENTER



### 16a. If YES, how much was the pack/can?

	Frequency	Valid, unweighted percent	Valid, weighted percent
\$2.00-\$4.49	2	12.5	6.4
\$4.50-\$4.99	1	6.3	11.4
\$5.00-\$5.49	5	31.3	32.3
\$5.50-\$8.50	8	50.0	50.0
Valid total	16	100.0	100.0
No answer	159		
Total	175		

Note: Data for this table include recorded prices for nonviolations.

WYOMING SURVEY & ANALYSIS CENTER

### Recorded price for a pack of cigarettes

*WYSAC constructed this variable from responses to items 16a and 17.*

	Frequency	Valid, unweighted percent	Valid, weighted percent
\$2.00-\$4.49	2	16.7	7.5
\$4.50-\$4.99	1	8.3	15.0
\$5.00-\$5.49	3	25.0	32.5
\$5.50-\$8.50	6	50.0	45.0
Valid total	12	100.0	100.0

Note: Data for this table include recorded prices for nonviolations.

WYOMING SURVEY & ANALYSIS CENTER

## Recorded price for a package of smokeless tobacco

WYSAC constructed this variable from responses to items 16a and 17.

	Frequency	Valid, unweighted percent	Valid, weighted percent
\$2.00-\$4.49	0	0.0	0.0
\$4.50-\$4.99	0	0.0	0.0
\$5.00-\$5.49	2	50.0	30.0
\$5.50-\$8.50	2	50.0	70.0
Valid total	4	100.0	100.0

Note: Data for this table include recorded prices for nonviolations.

WYOMING SURVEY & ANALYSIS CENTER

## 17: What type of tobacco did the youth inspector ask for? (Every third inspection should be for smokeless tobacco.)

	Frequency	Valid, unweighted percent	Valid, weighted percent
Cigarettes	129	73.7	71.8
Smokeless tobacco	46	26.3	28.2
Valid total	175	100.0	100.0

WYOMING SURVEY & ANALYSIS CENTER

## 18: What tobacco brand was attempted to be purchased?

Type of tobacco	Brand of tobacco product	Frequency	Valid, unweighted percent	Valid, weighted percent
Cigarettes	Marlboro Gold	101	57.7	56.7
	Camel Blue	24	13.7	12.6
	Camel	1	0.6	1.0
	Other	3	1.7	1.6
Smokeless tobacco	Skoal Wintergreen	41	23.4	23.9
	Copenhagen Wintergreen	5	2.9	4.3
	Valid total	175	100.0	100.0

“Other” responses:

- Marlboro Red (2)
- Blank (1)

WYOMING SURVEY & ANALYSIS CENTER

## 19: Did the clerk ask for youth’s ID?

	Frequency	Valid, unweighted percent	Valid, weighted percent
Yes	154	88.0	89.0
No	21	12.0	11.0
Total	175	100	100.0

WYOMING SURVEY & ANALYSIS CENTER

## 20: Did the clerk ask for youth's age?

	Frequency	Valid, unweighted percent	Valid, weighted percent
Yes	18	10.3	9.4
No	156	89.7	90.6
Valid total	174	100.0	100.0
No answer	1		
Total	175		

WYOMING SURVEY & ANALYSIS CENTER

## ENDS PILOT STUDY

Of the 47 outlets in the sample, 20 were *eligible* (see items 7 and 7a). Another three outlets were coded as eligible, but *not inspected* (see items 8 and 8a). Thus, WYSAC has a total of 17 inspected outlets for inclusion in analyses. For every question (except for 7 and 8), WYSAC only reports information for the 17 stores included in the analyses. For questions 7 and 8, WYSAC provides information on all 47 stores in the sample. For the ENDS Pilot Study, WYSAC does not provide weighted percentages because it would not be appropriate to weight the results to account for the sampling procedure used for the Synar Inspection Study.

### 1: Inspection month

	Frequency	Valid, unweighted percent
July	9	52.9
August	8	47.1
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

### 2: Time of visit

	Frequency	Valid, unweighted percent
AM	7	41.2
PM	10	58.8
Total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

### 3: Gender of youth inspector

	Frequency	Valid, unweighted percent
Stores inspected by boys	6	35.5
Stores inspected by girls	11	64.7
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

### 4: Age of youth inspector

	Frequency	Valid, unweighted percent
Stores inspected by 16-year-olds	10	58.8
Stores inspected by 17-year-olds	7	41.2
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

### 5: Outlet Stratum

	Frequency	Valid, unweighted percent
Rural	7	41.2
Urban	10	58.8
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

## 6: Outlet county

	Frequency	Valid, unweighted percent
Albany	0	0.0
Big Horn	0	0.0
Campbell	1	5.9
Carbon	1	5.9
Converse	0	0.0
Crook	1	5.9
Fremont	2	11.8
Goshen	1	5.9
Hot Springs	1	5.9
Johnson	0	0.0
Laramie	2	11.8
Lincoln	0	0.0
Natrona	2	11.8
Niobrara	0	0.0
Park	0	0.0
Platte	0	0.0
Sheridan	1	5.9
Sublette	1	5.9
Sweetwater	2	11.8
Teton	1	5.9
Uinta	1	5.9
Washakie	0	0.0
Weston	0	0.0
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

## 7: Was the outlet (store) eligible for inspection?

	Frequency	Valid, unweighted percent
Yes	20	42.6
No	27	57.4
Valid total	47	100.0

Note: Includes all tobacco retailers in the sample, unlike the majority of tables in this appendix.

WYOMING SURVEY & ANALYSIS CENTER

### 7a: If NO, mark one of the following reasons the store was ineligible for inspection:

	Frequency	Valid, unweighted percent
Does not sell tobacco products	4	14.8
Other (specify)	23	85.2
Valid total	27	100.0

Note. Includes only the 27 ineligible tobacco retailers from item 7, unlike the majority of tables in this appendix.

“Other” response:

— Did not sell vape products: (23)

WYOMING SURVEY & ANALYSIS CENTER

## 8: If outlet is eligible, was inspection completed?

	Frequency	Valid, unweighted percent
Yes	17	85.0
No	3	15.0
Valid total	20	100.0
Ineligible	23	
Total	47	

Note. Includes all tobacco retailers in the sample, unlike the majority of tables in this appendix.

WYOMING SURVEY & ANALYSIS CENTER



**8a: If NO, mark one of the following reasons the inspection was not completed:**

	Frequency	Valid, unweighted percent
Both youth inspectors knew someone in the store	3	100.0
Valid total	3	100.0

Note. Includes only the 3 uninspected, eligible tobacco retailers from item 7.

WYOMING SURVEY & ANALYSIS CENTER

**9: Type of store**

	Frequency	Valid, unweighted percent
Convenience (no gas)	1	5.9
Convenience (with gas)	10	58.8
Grocery store	3	17.6
Discount/ Superstore (e.g., Wal-Mart, Target)	1	5.9
Tobacco store	1	5.9
Restaurant / Cafe	1	5.9
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

## 10: Location of cigarettes

	Frequency	Valid, unweighted percent
Accessible (customers can pick up a pack of cigarettes without the assistance of an employee)	1	5.9
Not accessible (customers require assistance from an employee to obtain cigarettes)	16	94.1
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

## 11: Location of smokeless tobacco

	Frequency	Valid, unweighted percent
Accessible (customers can pick up a package of smokeless tobacco without the assistance of an employee)	1	6.3
Not accessible (customers require assistance from an employee to obtain smokeless tobacco)	15	93.8
Valid total	16	100.0
Youth inspector could not locate	1	
Total	17	

WYOMING SURVEY & ANALYSIS CENTER

## 12: Location of vapor products [ENDS]

	Frequency	Valid, unweighted percent
Accessible (customers can pick up ENDS without the assistance of an employee)	2	11.8
Not accessible (customers require assistance from an employee to obtain ENDS)	15	88.2
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

## Overall tobacco accessibility

WYSAC constructed this variable from responses to items 10 through 12 above.

	Frequency	Valid, unweighted percent
Cigarettes and/or smokeless tobacco and/or ENDS accessible (customers can pick up tobacco products without the assistance of an employee)	2	12.5
Neither cigarettes nor smokeless tobacco nor ENDS accessible (customers require assistance from an employee to obtain tobacco products)	14	87.5
Valid Total	16	100.0
Missing data (youth inspector could not locate one tobacco type)	1	
Total	17	

Note. Youth inspectors asked for a specific type of tobacco product (cigarettes, smokeless tobacco, or ENDS) and were trained to look for the other types of tobacco product during each inspection, though they were not always able to see displays for all tobacco types. For example, a youth may not have noticed an ENDS display during a cigarette inspection if it was out of their line of site during a quick transaction. In such cases, “youth inspector could not locate” would not be a valid indicator of that product’s accessibility in that retailer, so WYSAC treats that response as missing.

WYOMING SURVEY & ANALYSIS CENTER

## 13: Were there any youth access signs present in the store (e.g., “No Sales to Minors”)?

	Frequency	Valid, unweighted percent
Yes	15	93.8
No	1	6.3
Valid total	16	100.0
No answer	1	
Total	17	

WYOMING SURVEY & ANALYSIS CENTER

#### 14: Clerk gender

	Frequency	Valid, unweighted percent
Man	2	11.8
Woman	15	88.2
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

#### 15: Approximate age of clerk

	Frequency	Valid, unweighted percent
18-24	1	5.9
25-34	6	35.3
35-44	6	35.3
45-54	2	11.8
55-64	1	5.9
65-85	1	5.9
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

#### 16: If inspection was completed, was buy attempt successful?

	Frequency	Valid, unweighted percent
Yes (violation)	2	11.8
No (nonviolation)	15	88.2
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

### 16a. If YES, how much was the product?

	Frequency	Valid, unweighted percent
Valid total	0	NA
No answer	17	
Total	17	

WYOMING SURVEY & ANALYSIS CENTER

### 17: What type of tobacco did the youth inspector ask for?

	Frequency	Valid, unweighted percent
E-cigarette	8	47.1
E-juice	9	52.9
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

### 18: What tobacco brand was attempted to be purchased?

Brand of tobacco product	Frequency	Valid, unweighted percent
Blu Cherry	7	41.2
VUSE Berry	5	29.4
VUSE Mint	2	11.8
VUSE Menthol	2	11.8
Other	1	5.9
Total	17	100.0

“Other” response:

— No flavors (1)

WYOMING SURVEY & ANALYSIS CENTER

### 19: Did the clerk ask for youth's ID?

	Frequency	Valid, unweighted percent
Yes	14	82.4
No	3	17.6
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

### 20: Did the clerk ask for youth's age?

	Frequency	Valid, unweighted percent
Yes	0	0
No	17	100.0
Valid total	17	100.0

WYOMING SURVEY & ANALYSIS CENTER

## *Appendix C. Detailed Calculations for the 2016 (FFY 2017) Synar Inspection Study*

### **APPENDIX C.1. INSPECTION STUDY SAMPLING DESIGN**

Table C-1 C-2 provides information on the sample sizes for the two strata, depicting input for and output from the SSES Sample Size Calculator. WYSAC entered several variables (under “Input Information” in Table C-1). An explanation of each input variable follows:

- **One-sided option for 95% Confidence Interval** meets the same precision requirement with a smaller sample size than the two-sided choice.
- **Outlet Frame Size** represents the total population of tobacco retail stores on the list frame. Because WYSAC conducted the sample size calculations separately for each stratum, the outlet frame size is specific to the stratum (urban or rural).
- **Expected Retailer Violation Rate (RVR)** is the expected RVR from last year’s survey. Again, the expected RVR is specific for each stratum.
- **Design Effect** is estimated from last year’s survey. The design effect normally accounts for the loss of effectiveness by using a sampling design other than a simple random sample. Because WYSAC conducted the sample size calculations separately and conducted a simple random sample within each stratum, the design effect for each stratum is 1.
- **Expected Accuracy Rate** is the percentage of outlets whose information was accurate on last year’s list frame. This rate provides an estimate of the proportion of outlets on the list frame that are eligible for the Synar survey. This percentage is specific to each stratum.
- **Expected Completion Rate** is the percentage of stores inspected by last year’s inspection teams. The numerator is the percentage of outlets visited; the denominator is the number of outlets drawn for the sample. This percentage is specific to each stratum.
- **Safety Margin Used** is the percentage by which the sample size is inflated to ensure a large enough sample size. A safety margin allows WYSAC to account for ineligible outlets (e.g., businesses that had closed, were not accessible to minors, or did not sell tobacco) on the list frame. WYSAC uses a safety margin of 20.0% for each stratum.

Once WYSAC entered this information, SSES provided three outputs: effective sample size, target sample size, and planned original sample size for each strata. Definitions for each of these outputs follow. Numerical values are in Table C-1.

- **Effective Sample Size** is the sample size needed to meet the SAMHSA precision requirement under simple random sampling.
- **Target (Minimum) Sample Size** is the sample size needed to achieve the desired precision requirement with a complex sampling design. This number is the product of the effective



sample size and the design effect. Because the design effect for each strata is 1, the effective sample size is the same as the target sample size.

- **Planned Original Sample Size** is the actual sample size WYSAC used to draw the sample. To compute this number, SSES inflates the target sample size using the accuracy and completion rates and incorporates the safety margin.

**Table C-1. SSES Sample Size Outputs for the Sampling Frame**

<b>Synar Survey</b>		
State and stratum	WY rural	WY urban
FFY	2017	2017
Date	6/30/2016 15:19	6/30/2016 15:13
<b>Input Information</b>		
Option for 95% Confidence Interval	One-Sided	One-Sided
Outlet Frame Size	193	477
Expected Retailer Violation Rate	7.30%	2.80%
Design Effect	1	1
Expected Accuracy Rate	94.40%	90%
Expected Completion Rate	92.50%	100%
Safety Margin Used	20%	20%
<b>Sample Size</b>		
Effective Sample Size	100	70
Target(Minimum) Sample Size	100	70
Planned Original Sample Size	138	94

Based on the FFY 2017 (calendar year 2016) Synar results, the input values for the FFY 2018 (calendar year 2017) Synar inspections are as follows:

- Rural stratum
  - Expected RVR = 12.4%
  - Expected accuracy rate =  $119/138 = 86.2\%$
  - Expected completion rate =  $105/119 = 88.2\%$
- Urban stratum
  - Expected RVR = 11.4%
  - Expected accuracy rate =  $78/94 = 83.0\%$
  - Expected completion rate =  $70/78 = 89.7\%$

## APPENDIX C.2. RVR CALCULATIONS

WYSAC estimated the number of total outlets eligible for inspection in the list frame by

$$N_{urban} \left( \frac{n_{1\ urban}}{n_{urban}} \right) + N_{rural} \left( \frac{n_{1\ rural}}{n_{rural}} \right) = N_{total}$$

where

$N_{total}$  = the estimated number of total outlets eligible for inspection in the list frame

$N_{urban}$  = the number of urban stratum outlets on the list frame

$n_{1\ urban}$  = the number of outlets eligible for inspection within the urban stratum

$n_{urban}$  = the number of outlets in the original sample within the urban stratum

$N_{rural}$  = the number of rural stratum outlets on the list frame

$n_{1\ rural}$  = the number of outlets eligible for inspection within the rural stratum

$n_{rural}$  = the number of outlets in the original sample within the rural stratum

This gives an estimated number of total outlets eligible for inspection:

$$477 \frac{78}{94} + 193 \frac{119}{138} = 562.236$$

WYSAC estimated the weighted RVR by

$$\left( \frac{x_{urban}}{n_{2\ urban}} \right) \left( \frac{n_{1\ urban}}{n_{urban}} \right) \left( \frac{N_{urban}}{N_{total}} \right) + \left( \frac{x_{rural}}{n_{2\ rural}} \right) \left( \frac{n_{1\ rural}}{n_{rural}} \right) \left( \frac{N_{rural}}{N_{total}} \right) = \text{weighted RVR}$$

Where, in addition to the variables defined above

$x_{urban}$  = the number of noncompliant outlets within the urban stratum

$n_{2\ urban}$  = the number of outlets inspected within the urban stratum

$x_{rural}$  = the number of noncompliant outlets within the rural stratum

$n_{2\ rural}$  = the number of outlets inspected within the rural stratum

Thus, the weighted noncompliance rate for the 2015 (FFY 2016) Synar Inspection Study was

$$\left( \frac{8}{70} \right) \left( \frac{78}{94} \right) \left( \frac{477}{562.236} \right) + \left( \frac{13}{105} \right) \left( \frac{119}{138} \right) \left( \frac{193}{562.236} \right) = .117 \text{ or } 11.7\%$$

## APPENDIX C.3. ANALYSES OF ASSOCIATIONS WITH RETAILER VIOLATIONS

The tables on the following three pages present the results of WYSAC's analyses to examine the possible association between selected variables and retailer violations. WYSAC used one-tailed Fisher's exact tests because two tailed tests (as were used with Pearson's chi squared) tend to be overly conservative (Agresti, 2007, pp. 45–48). ***Bold, italicized text*** in the tables indicates the three variables that showed statistically significant relationships with retailer violation for the full data set, cigarette inspections, and smokeless tobacco inspections. *Italicized text* in the tables indicates additional statistically significant findings.

**Table C.3-1: Testing Associations with Retailer Violation: Cigarettes and Smokeless Tobacco, Combined**

*Full results of statistical tests*

Variable	$\chi^2$	Degrees of freedom	Weighted number of outlets included	Statistical significance (p)	Higher RVR situation*
<b><i>Ask for identification</i></b>	<b>366.30</b>	<b>1</b>	<b>563</b>	<b>&lt; .001</b>	<b><i>Not asking for ID</i></b>
<b><i>Age rating of youth inspector, dichotomized</i></b>	<b>10.26</b>	<b>1</b>	<b>563</b>	<b>.001</b>	<b><i>Looking 18 or older</i></b>
<i>Youth inspector age</i>	12.71	1	561	< .001	16 years old
<b><i>Adult supervisor</i></b>	<b>16.07</b>	<b>2</b>	<b>562</b>	<b>&lt; .001</b>	<b><i>Driver of the trip with the high RVR had a high RVR</i></b>
<i>Accessibility of any tobacco product, dichotomized</i>	9.46	1	400	.002	At least one tobacco product accessible
Youth access signs	2.05	1	561	.153	Not having signs
Ask age	3.49	1	561	.062	Not asking for youth's age
Clerk gender	2.97	1	562	.085	Men
Time of inspection	2.30	1	562	.130	Afternoon
Estimated clerk age, dichotomized	0.23	1	563	.633	35 or younger
Month of inspection	0.97	2	563	.615	August
Rural/Urban stratum	0.17	1	563	.683	Rural
Store type, dichotomized	1.00	1	563	.317	Convenience store with or without gas
Youth inspector gender	1.64	1	562	.200	Girl
Type of tobacco	1.68	1	562	.195	Smokeless tobacco

\* The higher RVR situation for nonsignificant associations is provided for informational purposes only

Note: The number of outlets included in analyses varies because of weighting and missing data. As in the report, WYSAC dichotomized youth inspector age ratings (18 or older vs. younger than 18), estimated clerk age (36 and older vs. younger than 36), store type (convenience with or without gas vs. all others), and tobacco accessibility (none accessible vs. at least some accessible). ***Bold, italicized text*** indicates the three variables that showed statistically significant relationships with retailer violation for the full data set, cigarette inspections, and smokeless tobacco inspections. *Italicized text* indicates additional statistically significant findings.

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**Table C.3-2: Testing Associations with Retailer Violation: Cigarettes Only**

*Full results of statistical tests*

Variable	$\chi^2$	Degrees of freedom	Weighted number of outlets included	Statistical significance (p)	Higher RVR situation*
<b><i>Ask for identification</i></b>	<b>253.46</b>	<b>1</b>	<b>404</b>	<b>&lt; .001</b>	<b><i>Not asking for ID</i></b>
<b><i>Age rating of youth inspector, dichotomized</i></b>	<b>4.38</b>	<b>1</b>	<b>403</b>	<b>.036</b>	<b><i>Look 18 or older</i></b>
<i>Youth inspector age</i>	10.92	1	404	.001	16 years old
<b><i>Adult supervisor</i></b>	<b>6.25</b>	<b>2</b>	<b>405</b>	<b>.044</b>	<b><i>Driver of the trip with the high RVR had a high RVR</i></b>
Accessibility of cigarettes	Fisher's exact test		405	.799	Not accessible
<i>Youth access signs</i>	4.65	1	403	.031	<i>Not having signs</i>
Ask age	0.44	1	402	.506	Not asking for age
Clerk gender	0.59	1	403	.443	Men
Time of inspection	0.07	1	404	.792	Morning
Estimated clerk age, dichotomized	0.01	1	404	.910	36 or older
Month of inspection	0.82	2	404	.665	August
Rural/Urban stratum	0.08	1	404	.780	Rural
Store type, dichotomized	0.20	1	404	.655	Convenience store, with or without gas
Youth inspector gender	0.79	1	405	.374	Girls

\* The higher RVR situation for nonsignificant associations is provided for informational purposes only

Note: The number of outlets included in analyses varies because of weighting and missing data. As in the report, WYSAC dichotomized youth inspector age ratings (18 or older vs. younger than 18), estimated clerk age (36 and older vs. younger than 36), and store type (convenience with or without gas vs. all others). ***Bold, italicized text*** indicates the three variables that showed statistically significant relationships with retailer violation for the full data set, cigarette inspections, and smokeless tobacco inspections. *Italicized text* indicates additional statistically significant findings.

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**Table C.3-3: Testing Associations with Retailer Violation: Smokeless Tobacco Only**

*Full results of statistical tests*

Variable	$\chi^2$	Degrees of freedom	Weighted number of outlets included	Statistical significance (p)	Higher RVR situation*
<b><i>Ask for identification</i></b>	<b><i>Fisher's exact test</i></b>		<b><i>159</i></b>	<b><i>&lt; .001</i></b>	<b><i>Not asking for ID</i></b>
<b><i>Age rating of youth inspector, dichotomized</i></b>	<b><i>6.70</i></b>	<b><i>1</i></b>	<b><i>159</i></b>	<b><i>.010</i></b>	<b><i>Look 18 or older</i></b>
Youth inspector age	1.43	1	158	.233	16 years old
<b><i>Adult supervisor</i></b>	<b><i>11.33</i></b>	<b><i>2</i></b>	<b><i>159</i></b>	<b><i>.003</i></b>	<b><i>Driver of the trip with the high RVR had a high RVR</i></b>
Accessibility of smokeless tobacco	Fisher's exact test		158	.729	Not accessible
Youth access signs	< 0.01	1	159	.976	Not having signs
<b><i>Ask age</i></b>	<b><i>Fisher's exact test</i></b>		<b><i>158</i></b>	<b><i>0.20</i></b>	<b><i>Not asking for age</i></b>
<b><i>Clerk gender</i></b>	<b><i>4.86</i></b>	<b><i>1</i></b>	<b><i>158</i></b>	<b><i>.028</i></b>	<b><i>Men</i></b>
<b><i>Time of inspection</i></b>	<b><i>9.66</i></b>	<b><i>1</i></b>	<b><i>159</i></b>	<b><i>.002</i></b>	<b><i>Afternoon</i></b>
Estimated clerk age, dichotomized	1.22	1	159	.270	35 or younger
Month of inspection	0.27	1	158	.604	August (no September inspections, unlike cigarettes)
Rural/Urban stratum	0.03	1	158	.866	Rural
Store type, dichotomized	0.45	1	159	.503	Convenience store, with or without gas
Youth inspector gender	2.69	1	158	.101	Girls

\* The higher RVR situation for nonsignificant associations is provided for informational purposes only

Note: The number of outlets included in analyses varies because of weighting and missing data. As in the report, WYSAC dichotomized youth inspector age ratings (18 or older vs. younger than 18), estimated clerk age (36 and older vs. younger than 36), and store type (convenience with or without gas vs. all others). ***Bold, italicized text*** indicates the three variables that showed statistically significant relationships with retailer violation for the full data set, cigarette inspections, and smokeless tobacco inspections. *Italicized text* indicates additional statistically significant findings.

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## *Appendix D. Synar Inspection Form 2016 (FFY 2017)*

The Synar Inspection Form for 2016 (FFY 2017) is on the following two pages.