Wyoming's 2013 (FFY 2014) Synar Tobacco Compliance Report: Coverage and Inspection Studies

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Wyoming's 2013 (FFY 2014) Synar Tobacco Compliance Report:

Coverage and Inspection Studies

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1. Executive Summary

The Synar Amendment, enacted in 1992, requires states to enact and enforce laws prohibiting the sale and distribution of tobacco products to individuals under the age of 18 (Substance Abuse and Mental Health Services Administration [SAMHSA], 2010). The SAMHSA regulation implementing the Synar Amendment requires states to conduct annual, random, and unannounced inspections to ensure compliance with tobacco sales laws.

Since 2003, the Wyoming Department of Health has contracted with the Wyoming Survey & Analysis Center (WYSAC) at the University of Wyoming to conduct the Synar compliance inspections. This year, WYSAC also conducted a required, extensive coverage study to determine how well the state's tobacco retailer list frame (used to conduct the Synar inspection study) reflects the actual composition of tobacco retail stores in the state. **The overall weighted coverage rate was 83.4%, above the federally stipulated minimum of 80.0%.** The urban (92.6%) coverage rate was statistically significantly higher than the rural (72.4%) coverage rate.

For the Synar Inspection Study, WYSAC recruits minor buyers (16- and 17-year-old youth) each summer to conduct these inspections, under adult supervision, on a stratified random sample of tobacco retail stores in Wyoming. **The overall weighted retailer violation rate (RVR) in 2013 was 7.6%, below the federally stipulated maximum of 20.0%.**

As in all Synar Inspection Study results since 2007 (WYSAC, 2012), clerks who asked the youth inspectors for identification (which, according to protocol, youth inspectors could not provide) were much less likely to violate than clerks who did not ask for identification. Since 2007, asking for identification has been the variable most closely associated with violations.

The following additional conclusions were the same for associations with the overall (both tobacco types) RVR and the cigarette- and chewing tobacco-specific RVRs. All RVRs reported in this list are combined across tobacco types.

- For both tobacco types combined, rural stores had a higher RVR (35.5%) than urban stores (11.4%).
- Analyses did not indicate a statistically significant association between clerks' willingness to sell tobacco and
  - Month of inspection (July vs. August),
  - Time of inspection (morning vs. afternoon),
  - Youth inspector perceived age (younger than 18 vs. 18 and older),
  - Store type (convenience vs. all other store types),
  - Clerk gender,
  - Clerk age (35 and younger vs. older than 35, a median split), and
  - Clerks asking youth inspectors for their age.

Chewing tobacco inspections had a higher RVR (12.8%) than inspections for cigarettes (5.7%). Additionally, conclusions for some variables were different for the different types of tobacco: (a) combined, (b) cigarettes, and (c) chewing tobacco. The following conclusions were dependent on type of tobacco:

- Youth inspector gender
  - For chewing tobacco inspections, female youth inspectors had a higher RVR (20.0%) than male youth inspectors (6.9%).
  - Combined and for cigarettes, the relationship was not statistically significant.
- Youth inspector age
  - For the combined RVR, 17-year-old inspectors had a higher RVR (9.7%) than 16-year-old inspectors (4.6%).
  - When broken down by tobacco type, the relationship was not statistically significant for cigarettes or chewing tobacco.
- Adult supervisor
  - For the combined RVR and for cigarettes, there was a statistically significant relationship between adult supervisors and RVR. One driver had an atypically high RVR (17.6% combined and 16.0% for cigarettes), and another driver had an atypically low RVR (3.6% combined and 2.7% for cigarettes).
  - For chewing tobacco inspections, the relationship was not statistically significant.
- Accessibility of tobacco
  - For chewing tobacco inspections, stores that had chewing tobacco accessible to customers had a higher RVR (11.8%) than stores that did not have it accessible (0.0%). However, very few stores had accessible chewing tobacco.
  - For cigarette inspections, the relationship with accessible cigarettes was not statistically significant.
  - The relationship between combined RVR and a composite variable of overall tobacco accessibility was not statistically significant.
- Signs regarding youth access to tobacco products
  - When inspections for both tobacco types were combined, stores without signs regarding youth access to tobacco products had a statistically significantly higher RVR (19.4%) than stores that did have signs (6.9%).
  - When broken down by tobacco type, the relationship was not statistically significant for cigarettes or chewing tobacco.

The results of the 2013 (FFY 2014) Synar Coverage and Inspection Studies identify a few factors for intervention or continued monitoring. First, the results of the Coverage Study identify a need to improve the coverage of rural stores in the sampling frame. Second, analyses showed that two adult supervisors were associated with atypical RVRs in 2013 (FFY 2014). WYSAC cannot rule out youth or geographic factors because of the small number of inspection teams and the fact that only one pair of youth inspectors worked with more than one driver. In future years, WYSAC can continue to analyze results to identify potential influences of adult supervisors or specific trips on the statewide RVR. Finally, the Inspection Study results suggest areas of intervention to maintain or improve the low RVR. Training efforts could include training clerks to ask all customers for identification before selling them tobacco products. These trainings may have maximum impact by focusing on clerks working in rural areas, asking all females for identification, and customers purchasing chewing tobacco. Additionally, educational efforts regarding placing tobacco out of customers' reach may

benefit the Synar RVR and compliance with state and federal regulations about the placement of tobacco products.

2. Introduction

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 Congressman Mike Synar (Democrat, Oklahoma), requires states to adopt and enforce 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 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 (WDH) 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 retailer's compliance with the law.

The Family Smoking Prevention and Tobacco Control Act and Federal Retirement Reform (Tobacco Control Act; Public Law 111-31) was signed into law on June 22, 2009, giving the U.S. Food and Drug Administration (FDA) authority over the marketing, sale, and distribution of tobacco products. This act includes the section Regulations Restricting the Sale and Distribution of Cigarettes and Smokeless Tobacco to Protect Children and Adolescents. These regulations were designed to reduce tobacco use by children and adolescents by placing restrictions on the marketing, sale, and distribution of tobacco products. For example, the law requires tobacco retailers to verify that purchasers of tobacco products are 18 years of age or older with photo identification of anyone 26 years of age or younger. The regulations also prohibit self-service displays and vending machines in areas accessible to youth (FDA, 2010b).

2.1. Report Organization

This document contains six sections. Sections 1 and 2 provide the Executive Summary and Introduction, respectively. Section 3 describes the data collection and analysis methods and key findings of the 2013 (FFY2014) Coverage Study. Section 4 describes the data collection and analysis methods and key findings of the 2013 (FFY2014) Synar Inspection Study. Section 5 provides conclusions and gives recommendations for future Synar inspections. Section 6 contains a list of references cited in the report. Section 7 contains six (A-F) Appendices. Appendix A presents detailed calculations for the Coverage Study, including sampling and analyses. Appendix B contains the script used to train youth inspectors. Appendix C displays the results for each question on the 2013 (FFY 2014) Synar Inspection Form. Appendix D includes detailed calculations for the inspection sampling design, the RVR, and the analyses of associations between violations and other factors. Appendix E contains information for CSAP's FFY 2014 Annual Synar Report.[1] Appendix F is the data collection form used for the 2013 (FFY2014) Synar Inspection Study.

[1] Conducted in calendar year 2013.

3. Coverage Study

SAMHSA requires states to conduct a coverage study every three years (SAMHSA, 2006). The purpose of the coverage study is to assess how well the state's tobacco retailer list frame (used to draw the sample for the Synar Inspection Study) reflects the full population of youth-accessible tobacco retail stores in the state.[2] Low coverage list frames may bias the estimate of the retailer violation rate because the unlisted stores may differ from those on the list with respect to their likelihood of selling tobacco to minors (SAMHSA, 2006). Therefore, to comply with SAMHSA requirements, WYSAC conducted coverage studies in 2007 (WYSAC, 2007), 2010 (WYSAC, 2010), and again with this study in 2013.

3.1. Coverage Study Methods

This section includes descriptions of the methods for the sampling design, protocol, and analyses for the 2013 Synar Coverage Study.

3.1.1. Coverage Study Sampling Design

To conduct the Coverage Study, WYSAC followed SAMHSA (2006) protocol as outlined in their *Guide for a Synar Sampling Frame Coverage Study*. WYSAC used census tracts (defined by the U.S. Census Bureau) to define the geographical areas for the coverage study. To reduce costs and improve efficiency, WYSAC used a stratified sampling design by dividing the census tracts into two strata (or categories). WYSAC reviewed the stratification method used in 2007 (based on square mileage). Because the U.S. Census Bureau had re-drawn tract boundaries, the previous urban and rural definitions for census tracts in the Coverage Study no longer corresponded to the urban and rural definitions for the towns in the Inspection Study. To correct this problem, WYSAC defined *urban* census tracts as those with a population density of at least 100 people per square mile and *rural* census tracts as those with a population density lower than 100 people per square mile.[3] WYSAC then sampled 25 of the 79 urban tracts and 6 of the 52 rural tracts. Because rural tracts are more costly to canvass, WYSAC oversampled urban tracts and under-sampled rural tracts. As recommended by SAMSHA, WYSAC sampled a total of 31 tracts to include an estimated 120 tobacco retail stores.

3.1.2. Coverage Study Protocol

Once WYSAC drew the sample, WYSAC hired several qualified drivers to conduct the coverage study. WYSAC trained them on how to canvass each census tract, noting *all* stores that sold tobacco *and* were accessible to minors.[4] WYSAC sent two drivers on most coverage study trips so that one could navigate and look for stores while the other drove. One trip was to a very rural area with a very low expected number of retailers, so WYSAC sent a single driver to reduce costs. WYSAC instructed drivers *not* to canvass graded and earth roads (unless there were indications of businesses and the road would be passable to typical passenger vehicles) and any area that was inaccessible to

[2] Stores on federal land, such as national parks, and Indian Reservations are not inspected by states during the Synar inspections. 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 Reservation.

[3] WYSAC eliminated one tract (F.E. Warren Air Force Base) because it is completely inaccessible to the general public.

[4] Bars and liquor stores are not legally accessible to minors in Wyoming (without a parent or guardian), so canvassers did not note these types of retailers.

the general public (e.g., state or national parks where one must pay an entrance fee). Per SAMHSA protocol, drivers did not use any lists to identify stores.

Drivers listed 130 stores. Two potential stores were closed when the drivers located them and could not be evaluated for eligibility. Drivers flagged additional stores for further investigation after the field work because of questions about eligibility. WYSAC called these stores to determine their eligibility and, when appropriate, excluded them from the sample. WYSAC removed six stores from the original list because, upon further investigation, they were not eligible for the Synar inspections (they either did not sell cigarettes or chewing tobacco or were not accessible to youth). The final coverage list contained 124 stores.

3.1.3. Coverage Study Analysis

At the end of the 2012 (FFY 2013) Synar Inspection Study, WYSAC removed ineligible and closed stores from the tobacco retailer list. In the spring of 2013, WYSAC requested updates to this revised list from all the county-based community prevention professionals (CPPs) working for the Prevention Management Organization of Wyoming (PMO). WYSAC used this updated list of 520 stores for the 2013 (FFY 2014) tobacco retailer list frame for the Coverage and Inspection Studies.

To determine the coverage rate, WYSAC carefully compared the list of stores discovered during the coverage study to the stores on the tobacco retailer list frame. If the store found during the coverage study was on the tobacco retailer list frame with a matching or similar address, the store was considered *covered* by the tobacco retailer list frame. WYSAC then determined if the address on the tobacco retailer list frame was 100% accurate.

After WYSAC checked all canvassed stores against the list frame, WYSAC determined an overall weighted coverage rate using the procedure outlined by SAMHSA (2006). When calculating the coverage rate, WYSAC accounted for the use of the stratified sampling design to conduct the coverage study. WYSAC used a sampling weight for each sample area (i.e., urban or rural).

WYSAC also calculated a weighted accuracy rate, excluding stores that were not covered by the inspection list, to determine the accuracy of the tobacco retailer list frame. To calculate the accuracy of the tobacco retailer list frame, WYSAC compared the coverage study results to the list frame. WYSAC followed SAMHSA's definition of accuracy: WYSAC considered a store's information 100% accurate if the tobacco retailer list frame information would allow field workers to easily locate the store. If the address from the coverage study and the address from the list frame were identical, WYSAC determined that the list information on the store was accurate. If the coverage study listed a different *name* than the name on the list frame, WYSAC still considered the information on the store accurate because the name change would not prevent somebody from locating it. Appendix A presents detailed information about our coverage study sample size, sample allocation, weighted coverage, and weighted accuracy rate calculations.

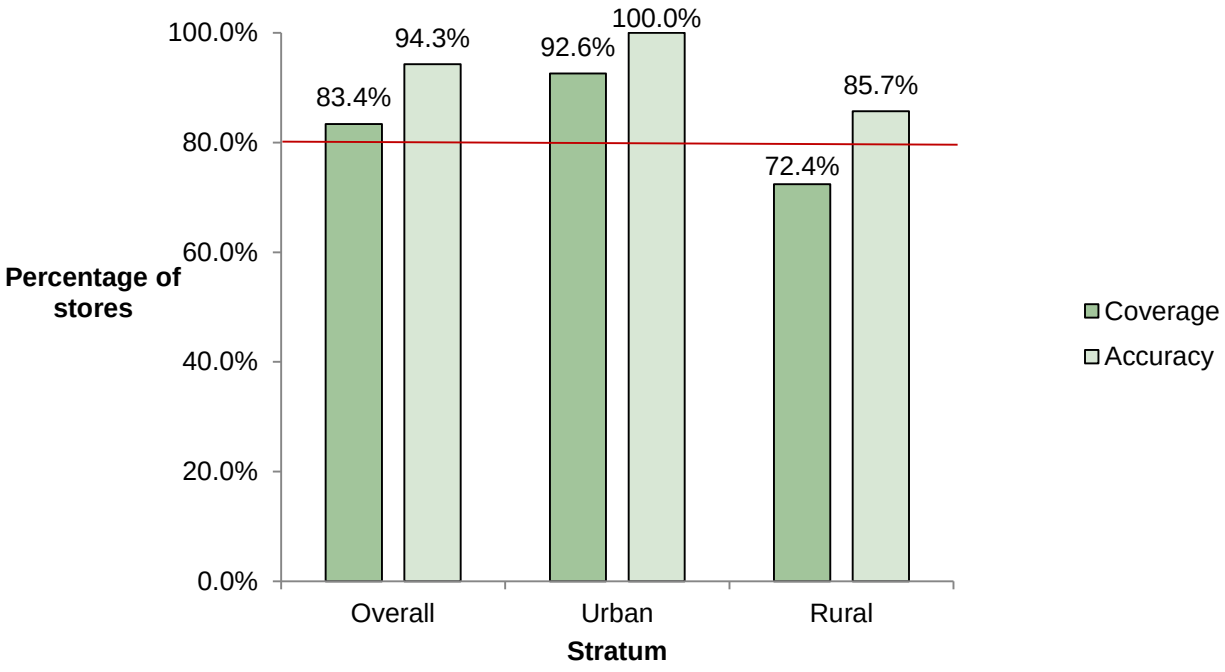
WYSAC conducted two types of crosstab analyses (Pearson's chi-squared test or Fisher's exact test) to examine differences between the urban and rural strata for coverage and accuracy. Depending on the specific analysis, WYSAC used Pearson's chi-squared test or Fisher's exact test to identify statistically significant associations. Fisher's exact test is an alternative to Pearson's chi-squared test. It provides more reliable results than Pearson's chi-squared in analyses where conditions in the crosstabs have few observations (as a general rule, a condition with zero observations, i.e., no covered, inaccurate urban stores).

3.2. Coverage Study Key Findings

WYSAC found an overall weighted coverage rate of 83.4% with a 95% Wald confidence interval of 79.7% to 86.0%. (See Appendix A for calculations.) SAMHSA *requires* a coverage rate of at least 80.0% and *recommends* a coverage rate of at least 90.0% (SAMHSA, 2006). Therefore, the coverage of the tobacco retailer list frame exceeded SAMHSA's required coverage rate but did not exceed the recommended coverage rate (Figure 1). The urban stratum had a coverage rate of 92.6% and the rural stratum had a coverage rate of 72.4%. The coverage rates for each stratum were significantly different, χ^2 (1, N = 551.5) = 40.4, p < .001. The coverage rate for rural stores was substantially lower than that for the urban stores.

WYSAC also calculated the accuracy of the tobacco retailer list frame. The overall accuracy rate for the tobacco retailer list frame was 94.3% with a 95% Wald confidence interval of 91.6% to 96.0%. Mirroring results for the weighted coverage rate, the list frame information was significantly less accurate for the rural stratum (85.7%) than for the urban stratum (100.0%), Fisher's exact test, one-tailed, p = <.001. [5]

Figure 1. Tobacco Retailer List Frame Coverage and Accuracy Rates



Note. The horizontal line indicates SAMHSA's required coverage rate (80%). The urban and rural strata had significantly different coverage and accuracy rates.

[5] Because of the unique characteristics of Fisher's exact test, two tailed tests (as were used with Pearson's chi squared) tend to be overly conservative (Agresti, 2007 pp. 45–48). Therefore, WYSAC used one-tailed Fisher's exact tests. The conclusion here would have been the same with a two-tailed test.

4. Inspection Study

This section includes descriptions of the methods for and key finding from the 2013 Synar Inspection Study.

4.1. Inspection Study Methods

This section includes descriptions of the sampling design, protocol, and analyses for the 2013 Synar Inspection Study.

4.1.1. Inspection Study Sampling Design

As detailed in Section 3.1.1, WYSAC updated the 2012 (FFY 2013) retailer list frame and used that for the sampling frame in 2013 (FFY 2014). As in previous years, WYSAC categorized each tobacco retail store 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 of fewer than 3,000. The list frame had 373 stores in the urban stratum and 147 stores in the rural stratum. WYSAC used the Synar Survey Estimation System (SSES), Version 5.1, to determine the sample size for each stratum. (See Appendix D.1 for more information about the sampling calculations and procedure.) WYSAC used a 20% safety margin for noncompletion, as recommended by SAMHSA (2011a). SSES yielded a planned sample size of 262 for the urban stratum and a planned sample size of 145 for the rural stratum. Because the planned sample size was virtually a census of the rural stores, WYSAC decided to include all 147 rural stores in the inspection sample, resulting in a total planned sample of 409 stores. WYSAC drew a random sample for the urban stratum using IBM SPSS Statistics Version 21.

4.1.2. Inspection Study Protocol

The 2013 (FFY 2014) Synar inspections began on July 15 and ended on August 16. Ten teams completed the inspections. The teams consisted of one adult supervisor/driver and two youth inspectors (one male and one female). Females completed 49.7% of the inspections (males completed 50.3%). WYSAC recruited 18 youth inspectors:[6] seven 16-year-olds (who completed 40.1% of the inspections) and eleven 17-year-olds (who completed 59.9% of the inspections).

As required by the Wyoming Attorney General, a local law enforcement officer (from county sheriff's offices and city police departments) was available for every inspection. Law enforcement officers did not accompany the youth inspectors into the store. The primary role of the law enforcement officers was to observe the inspections; they did not issue any citations for noncompliance. WYSAC collaborated with the Wyoming Association of Sheriffs and Chiefs of Police (WASCOP) to find and coordinate with local officers who had jurisdiction over the areas in which the teams conducted inspections.

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

In previous years, WYSAC recruited youth inspectors primarily by contacting youth inspectors from the previous year and rehiring them and/or seeking referrals. In 2012 (FFY 2013), WYSAC

[6] One pair of youth worked with two drivers, resulting in 10 teams.

encountered difficulty recruiting youth with this snowball method. In 2013 (FFY 2014), WYSAC recruited some youth inspectors by asking previous inspectors to participate again (if they were still in the eligible age range) and/or to provide referrals (especially if they had turned 18 or were no longer interested in participating). Additionally, WYSAC partnered with other organizations to identify youth contacts across the state. WYSAC partnered with Wyoming 4-H, some of the CPPs, and some of the supporting law enforcement agencies to recruit potential youth inspectors. After contacting youth identified by these groups, WYSAC continued to use the snowball method by asking these youth for referrals. WYSAC first contacted potential youth inspectors via telephone to describe the project and speak with one of their parents or guardians. Once the youth inspector 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 inspectors could participate.

All youth inspectors resided within the area they inspected, thereby reducing travel time and eliminating the need for overnight stays by the youth inspectors. To ensure consistency in buying procedure, all youth inspectors followed a written script (see Appendix B) 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, clerks' stated price of tobacco products, the presence of signs about not selling tobacco products to minors, the approximate age of the clerk, and the gender of the clerk).

Upon arriving at a store, one youth inspector (alternating between males and females) entered the store and, following the buyer script, attempted to purchase tobacco. During most inspections, youth inspectors attempted to purchase Marlboro Gold cigarettes. When those were unavailable, females attempted to purchase Camel Blues, and males attempted to purchase Camels. Based on WDH's interest in variables associated with violation rates for chewing tobacco, one out of every three inspections was for chewing tobacco. During chewing tobacco inspections, the youth inspectors (regardless of gender) asked for Skoal Wintergreen long cut or Copenhagen Wintergreen long cut (when Skoal Wintergreen was unavailable).

When youth inspectors knew anyone, including any employee or customer, in the store, they left the store without attempting a purchase and returned to the car. 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, the team returned later to attempt the buy, schedule permitting.

Survey protocol required youth inspectors to leave their identification in the car with the adult supervisors or to leave it at home. This strategy allowed youth inspectors to answer honestly if a clerk asked for identification, saying, "I don't have it on me." Similarly, if asked their age, youth inspectors were trained to answer honestly. The youth inspectors each carried approximately $1 in cash, so if a clerk was willing to sell the tobacco, they could not produce enough money to pay for it. 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 (e.g., 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 F for a copy.) WYSAC collected the forms at the end of each inspection trip. The information reported on the form includes the following:

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

Adult supervisors photographed each youth inspector on their first day of inspections. When the inspections were complete, WYSAC asked 29 raters unfamiliar with the Synar project to estimate the age of each youth inspector. One of these respondents did not answer whether or not he or she knew any of the youth inspectors, so WYSAC omitted that rater's responses. One respondent reported knowing one of the youth inspectors, so WYSAC eliminated that rater's estimate for that youth. WYSAC then calculated the mean for the 28 (27 for one youth inspector) ratings to determine the *perceived age* for each inspector. These ratings allowed WYSAC to statistically test for whether and under what conditions the youth inspectors who *looked* 18 or older made more successful purchase attempts (i.e., more violations). The lowest perceived age was 17.7 for the youngest-looking youth and the highest perceived age was 20.5 for the oldest-looking youth. Of the 18 youth inspectors, 14 had perceived ages of 18 or older, and four had perceived ages younger than 18. Because every youth inspector was and looked younger than 26, FDA regulations (FDA, 2010b) indicate that every youth inspector should have been asked for identification on every inspection.

A brief summary of recent changes to the Synar Inspection Study protocol follows: In 2010, the first year to include chewing 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 [UMNDJ]-School of Public Health, 2006) to choose the brands, flavor, and cut for the script. Also in 2011, WYSAC altered the script, which had previously had youth inspectors ask for Marlboro or Camel *Lights*, to the replacement brands introduced to the marketplace in response to the 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 chewing 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 chewing tobacco inspections.

4.1.3. Inspected Stores

Of the 409 stores in the sample, 28 were *ineligible*. These stores were ineligible for the following reasons: inaccessible to youth (7), out of business (6), did not sell tobacco products (6), could not be located (5), temporary closure (2), duplicated in the sample frame (1), and other (1; membership required to enter store). Thus, the total number of *eligible* stores was 381. Another 11 stores were eligible but *not inspected*. These stores were not inspected for the following reasons: in operation but closed at time of visit (4), both youth inspectors knew salesperson (1), and other (6): no employees available to ask (2), no support from law enforcement (2), lane closed (1), and only sold tobacco in the liquor store (1). Per SAMHSA (2011b) guidelines, WYSAC coded two additional stores as eligible, not inspected for other reason because they were missing data about whether the store resulted in a violation or not. WYSAC inspected and used data for 368 stores, or 96.6% of the eligible stores in the sample. Of these, 236 stores were in the urban stratum and 132 stores were in the rural stratum.

4.1.4. Inspection Study Analysis

To calculate the weighted RVR and most of the descriptive statistics reported in Sections 4.1.2 and 4.1.3 (above), WYSAC used SSES Version 5.1, an add-in for Microsoft Excel. SAMHSA distributes and recommends use of this software to facilitate reporting of analyses by each state. To facilitate identification of SSES output tables, WYSAC copied the relevant output tables from SSES directly into this document, preserving the formatting as generated by SSES (e.g., purple shading).

WYSAC conducted additional analyses in IBM SPSS Statistics version 21. WYSAC conducted two types of crosstab analyses (Pearson's chi-squared test or Fisher's exact test) to identify variables associated with violations. WYSAC used 2 x 5 Pearson's chi-squared tests to identify a relationship between adult supervisor and violations and adjusted standardized residuals to identify anomalous supervisors. All other variables were analyzed as dichotomous. 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. It provides more reliable results than Pearson's chi-squared in analyses where conditions in the crosstabs have few observations (as a general rule, a condition with zero observations, e.g., no clerks refusing to sell chewing tobacco when they did not ask for identification, or 25% of conditions with fewer than five observations).[7] In Appendix D.3, WYSAC reports which test WYSAC used for each reported association. In the report, WYSAC reports significant differences 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 Appendix C).

As in previous years, WYSAC dichotomized youth inspectors into two groups: youth inspectors who looked younger than 18 and youth inspectors who looked 18 or older (based on the mean of 28 independent, blind ratings for each youth inspector).

In previous years (2009, 2010), WYSAC created a logistic regression model to determine the most influential factors in predicting whether a clerk would attempt to sell tobacco products to minors, when statistically controlling for the other predictors. In those years, the primary predictor in models of violations was whether clerks asked youth inspectors for identification. In 2011 (FFY2012), the

[7] Because of the unique characteristics of Fisher's exact test, two tailed tests (as were used with Pearson's chi squared) tend to be overly conservative (Agresti, 2007 pp. 45–48). Therefore, WYSAC used one-tailed Fisher's exact tests.

relationship between clerks asking for identification and being willing to sell the tobacco product was nearly perfect: only one clerk who asked for identification was willing to sell. Therefore, WYSAC used asking for identification as a proxy for violation in developing a logistic regression model (WYSAC, 2011). In 2012 (FFY 2013), WYSAC could not perform a similar logistic regression. Although asking for identification and violations were strongly related, they were not so strongly related that WYSAC could treat asking for identification as a proxy for violation (as WYSAC did in 2011). When WYSAC attempted to model predictors of violations, asking for identification (or not) was a necessary variable (because of the strength of the association), but it was too strong for any other associations to be statistically significant. In effect, it would have masked the effects of other variables in the model (WYSAC 2012). In 2013 (FFY 2014), the model building process was again limited by the low RVR, the strong association between asking for identification and violations, and the additional limitation of various differences between conclusions for all inspections, cigarette inspections, and chewing tobacco inspections.

4.2. Inspection Study Key Findings

4.2.1. Retailer Violation Rate (RVR)

The noncompliance rate or retailer violation rate (RVR) is the weighted percentage of stores that attempted to sell to a youth inspector. Consistent with SAMHSA (2010, 2011b) guidelines, WYSAC weighted the data to account for different sampling ratios (i.e., sampling different percentages of the rural and urban stores) and different completion rates for the two strata (see Appendix D.2 for the RVR formula and detailed calculations). In 2013 (FFY 2014), the overall (both tobacco types combined) weighted RVR was 7.6%, a meaningful decline from 2012 (FFY 2013). When using two-sided confidence intervals, the 2013 (FFY 2014) was significantly lower than in 2012 (FFY 2013; Table 1). Because of changes to the Synar Inspection Study methods (i.e., changing the protocol for and ratio of chewing tobacco inspections, changing methods for recruitment of youth inspectors), RVRs from 2012 and 2013 should not be directly compared to nor combined with previous RVRs. Additionally, the high RVR in 2012 was influenced by the results of a single inspection trip (WYSAC, 2012).

Table 1. Weighted Retailer Violation Rates (RVRs), 2012–2013

Synar Inspection Study year	RVR (in %)	95%, one-sided confidence interval of RVR (in %)	95%, two-sided confidence interval of RVR (in %)
2012	14.4	0-16.9	11.8–16.9
2013	7.6	0–8.5	6.6–8.7

SSES provided a summary table of Synar Inspection Study estimates and sample sizes (Table 2). The standard error was ±0.5%, which meets the SAMHSA precision requirement of less than ±3.0%. Because WYSAC drew a sample of stores and did not inspect *all* stores in Wyoming, SSES calculated 95% confidence intervals (to account for the possibility of a sampling error). Therefore, as shown in Table 2, WYSAC is 95% confident that the "true" value of the RVR is between 0% and 8.5%.[8] Even when accounting for the confidence interval, the likely maximum RVR (8.5%) is still below the 20% noncompliance standard set by SAMHSA (see SAMHSA, 2011b, for details about SSES).

Table 2. Synar Inspection Study Estimates and Sample Sizes

CSAP-SYNAR REPORT

State	WY
Federal Fiscal Year (FFY)	2014
Date	10/3/2013 13:25
Data	SSES data.xlsx
Analysis Option	Stratified SRS with FPC

Estimates

Unweighted Retailer Violation Rate	8.7%
Weighted Retailer Violation Rate	7.6%
Standard Error	0.5%
Is SAMHSA Precision Requirement met?	YES
Right-sided 95% Confidence Interval	[0.0%, 8.5%]
Two-sided 95% Confidence Interval	[6.6%, 8.7%]
Design Effect	0.6
Accuracy Rate (unweighted)	93.2%
Accuracy Rate (weighted)	93.2%
Completion Rate (unweighted)	96.6%

Sample Size for Current Year

Effective Sample Size	185
Target (Minimum) Sample Size	185
Original Sample Size	409
Eligible Sample Size	381
Final Sample Size	368
Overall Sampling Rate	76.2%

[8] WYSAC used a one-sided confidence interval to determine the sample size and uses the same in the body of this report. WYSAC also provides two-sided confidence intervals in Table 2.

4.2.2. Additional Analyses

WYSAC used SPSS Statistics Version 21 to identify variables associated with retailer violations, using the customary criteria of $p < .05$ to identify significant differences. WYSAC weighted the data by strata with a noncompletion adjustment factor, as suggested by SAMHSA (2010) and as programmed in SSES (SAMHSA, 2011b; Technical details are provided in Appendix D.3.) Analyses did not indicate a statistically significant association between clerks' willingness to sell tobacco and

- Month of inspection (July vs. August),
- Time of inspection (morning vs. afternoon),
- Youth inspector perceived age (younger than 18 vs. 18 and older),
- Store type (convenience vs. all other store types),
- Tobacco brand,
- Clerk gender,
- Clerk age (35 and younger vs. older than 35, a median split), and
- Clerks asking youth inspectors for their age.

Therefore, WYSAC does not present detailed results for those variables in the body of this report.[9]

A summary of the other statistical results follows in Table 3. A discussion of the statistically significant associations follows the table. Because percentages reported in this section demonstrate RVRs within groups, they do not total 100% within or across figures. **RVRs and other percentages differ slightly between this section and Appendix C because of missing data in follow-up analyses (e.g., if a youth inspector did not report whether the clerk asked for identification for a specific inspection).**

[9] Detailed results are available upon request.

Table 3. Tested Associations with Retailer Violation, by Tobacco Type

Variable	High RVR situation (combined)	High RVR situation (cigarettes)	High RVR situation (chewing tobacco)
Tobacco type	Chewing tobacco	Not applicable	Not applicable
Ask for identification*	Did not ask for identification	Did not ask for identification	Did not ask for identification
Strata*	Rural	Rural	Rural
Adult supervisor	2 anomalous supervisors (one high, one low)	2 anomalous supervisors (one high, one low)	No statistically significant difference
Youth inspector age	17-year-olds (vs. 16-year-olds)	No statistically significant difference	No statistically significant difference
Signs regarding youth access to tobacco	Stores without signs	No statistically significant difference	No statistically significant difference
Youth inspector gender	No statistically significant difference	No statistically significant difference	Females
Accessibility of tobacco to customers without employee assistance	No statistically significant difference†	No statistically significant difference	Chewing tobacco accessible

* Statistical results did not differ by type of tobacco.
† WYSAC used a composite variable that contrasted stores that had any tobacco accessible with stores that had no tobacco accessible, omitting stores that had unknown accessibility for either type of tobacco.

As seen in Table 3, chewing tobacco (12.8%) had a higher RVR than cigarettes (5.7%), and clerks asking for identification and stores in the rural strata, and a small number of anomalous adult supervisors were associated with higher RVR for all tobacco types (combined, cigarettes, and chewing tobacco) and cigarette inspections. Youth inspectors who were 17 and stores without signs about the prohibition of tobacco sales to minors had higher RVRs when tobacco types were combined, but not when they were examined separately. The trends were similar for the individual tobacco types, suggesting the tests within specific tobacco types lacked the statistical power to identify the differences as statistically significant. Female youth inspectors had higher RVRs than males for chewing tobacco inspections, but not for cigarette inspections or when tobacco types were combined. Similarly, RVR was higher for chewing tobacco inspections when chewing tobacco was accessible to customers, but there was no statistically significant relationship between cigarette accessibility and RVR for cigarette inspections nor for a composite variable of any tobacco accessibility and RVR for all inspections. The relatively large proportion of cigarette inspections, combined with lower RVR for cigarette inspections, likely overwhelmed the chewing tobacco inspections when tobacco types were combined, possibly masking true relationships between RVR and youth inspector gender or tobacco accessibility. Additionally, very few stores had tobacco products accessible to customers (likely because FDA [2010b] regulations restrict the placement of tobacco products).

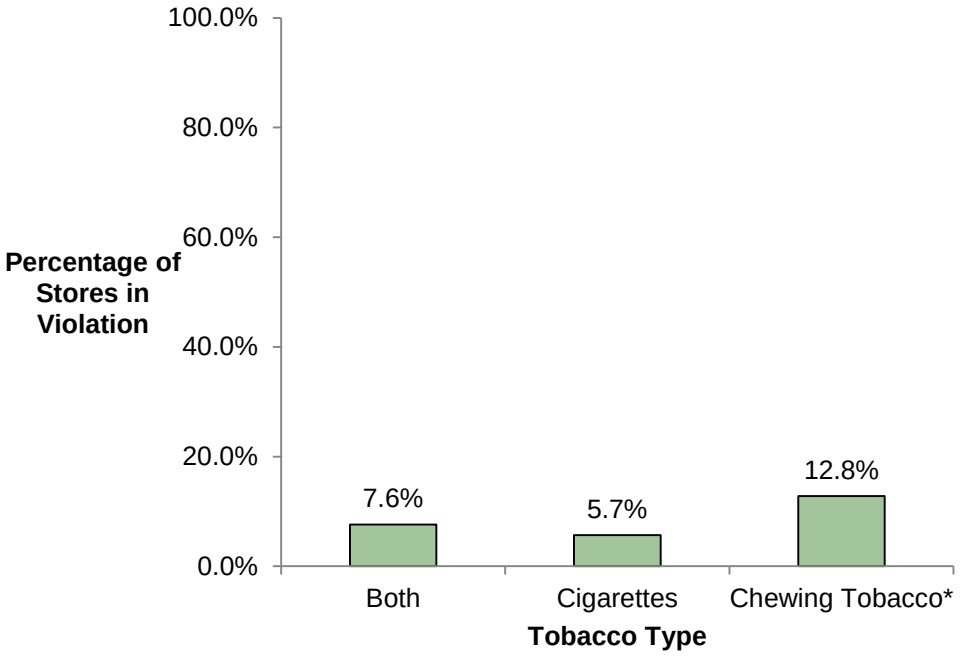
4.2.3. Significant Associations with Violations: Crosstab Analyses

In this section, WYSAC reports detailed results for variables associated with clerks' willingness to sell tobacco to minors.

Type of Tobacco

The RVR for chewing tobacco was higher than for tobacco types combined or for cigarettes (Figure 2).

Figure 2. Association between Tobacco Type and Violations

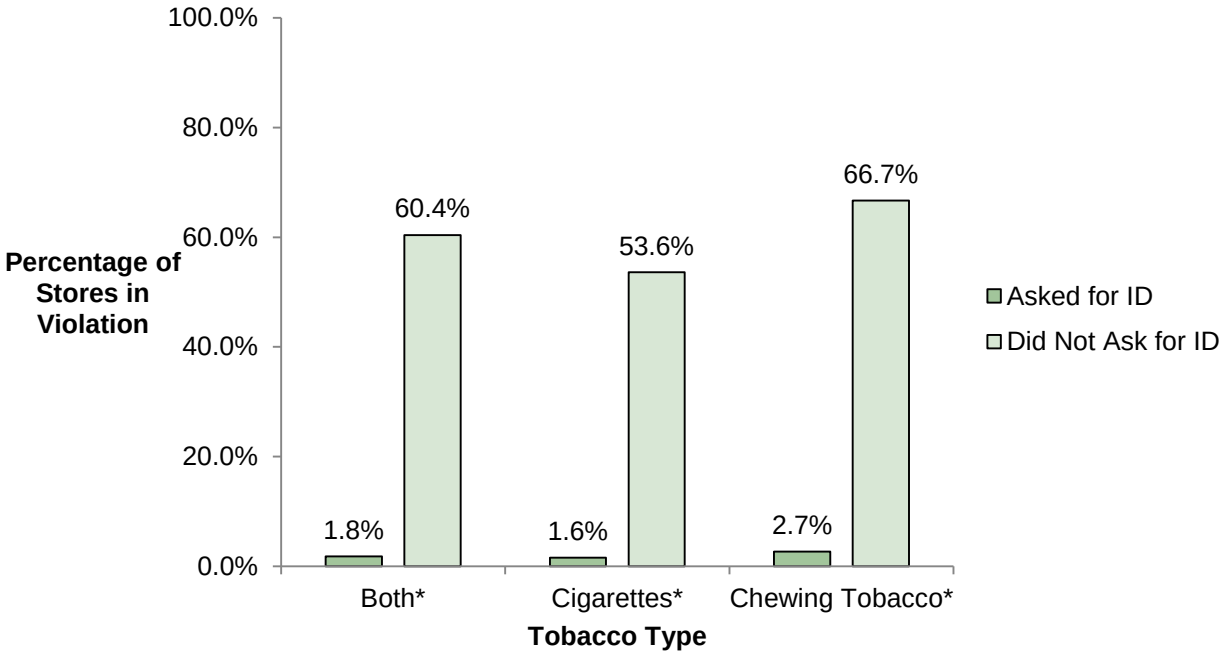


*Indicates statistically significant difference.

Clerks Asking for Identification

Overall and for each type of tobacco, clerks who asked youth inspectors for identification were much less likely to violate than clerks who did not ask for identification (Figure 3).

Figure 3. Association between Clerks Asking for Identification and Violations

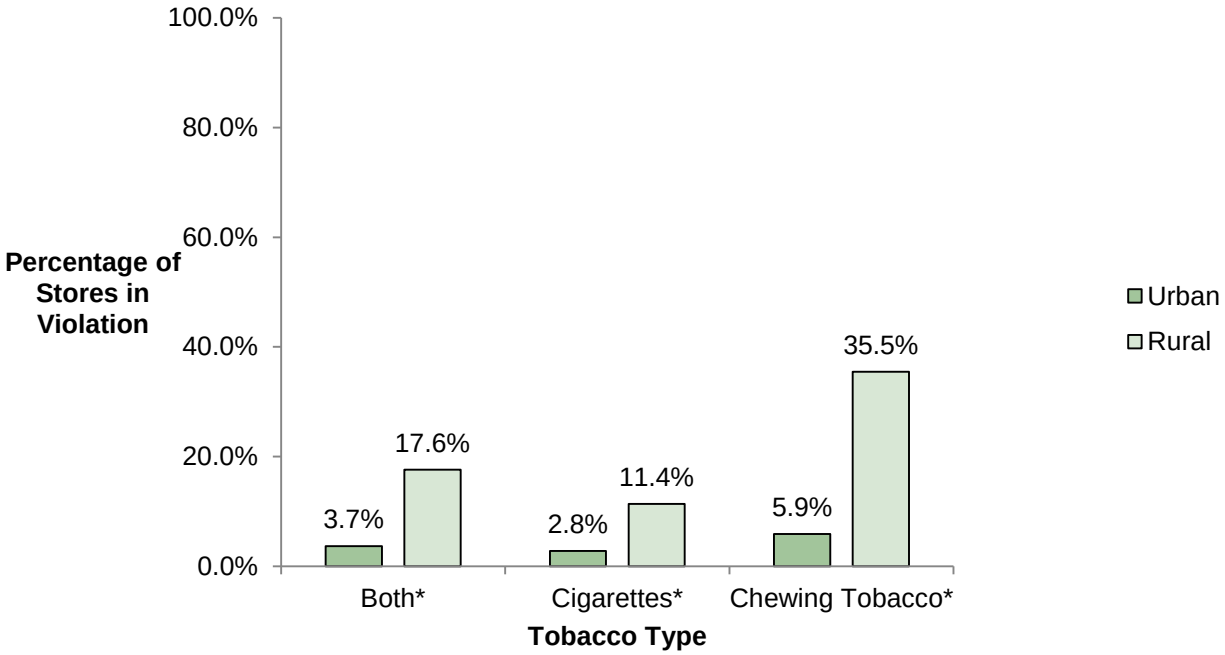


*Indicates statistically significant difference within tobacco type.

Strata

Overall, for cigarettes, and for chewing tobacco, the RVRs were higher in the rural strata than the urban strata (Figure 4).

Figure 4. Association between Strata and Violations

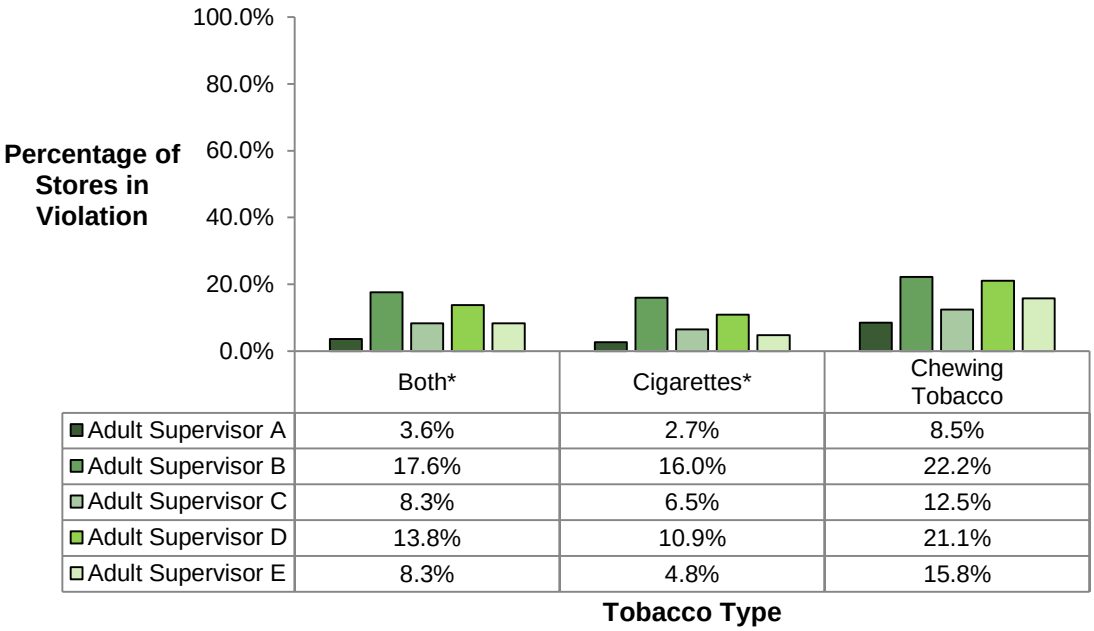


*Indicates statistically significant difference within tobacco type.

Adult Supervisor

Overall and for cigarettes, but not for chewing tobacco, Adult Supervisor A had a lower RVR than the other drivers, and Adult Supervisor B had a higher RVR than the other drivers (Figure 5).

Figure 5. Association between Adult Supervisor and Violations



	Both*	Cigarettes*	Chewing Tobacco
Adult Supervisor A	3.6%	2.7%	8.5%
Adult Supervisor B	17.6%	16.0%	22.2%
Adult Supervisor C	8.3%	6.5%	12.5%
Adult Supervisor D	13.8%	10.9%	21.1%
Adult Supervisor E	8.3%	4.8%	15.8%

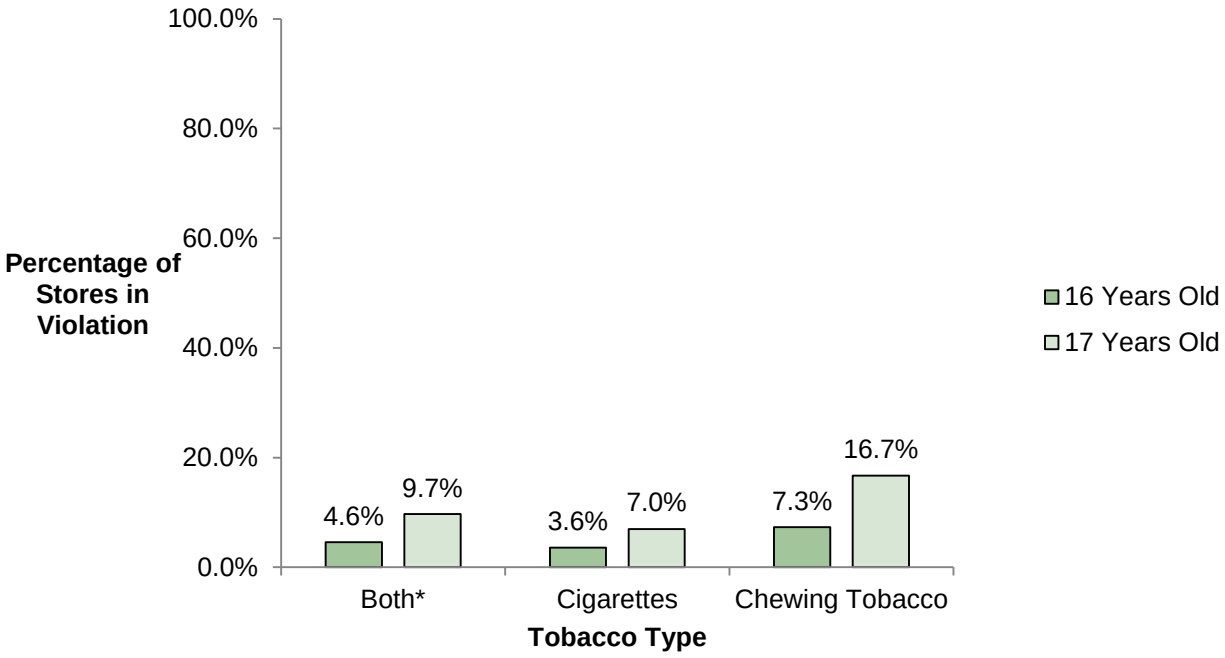
Tobacco Type

*Indicates statistically significant difference within tobacco type.

Youth inspector age

Youth inspectors who were 17 years old, compared to the 16-year-olds, were more likely to find clerks willing to sell them tobacco products when analyses combined the two types of tobacco. For the individual tobacco products, the pattern was similar but not statistically significant, indicating that the analyses lacked statistical power to identify the relationship as statistically significant (Figure 6). This is especially likely for chewing tobacco because the difference in RVRs (9.4 percentage points) for chewing tobacco was greater than the difference when tobacco types were combined (5.1 percentage points).

Figure 6. Association between Youth Inspector Age and Violations

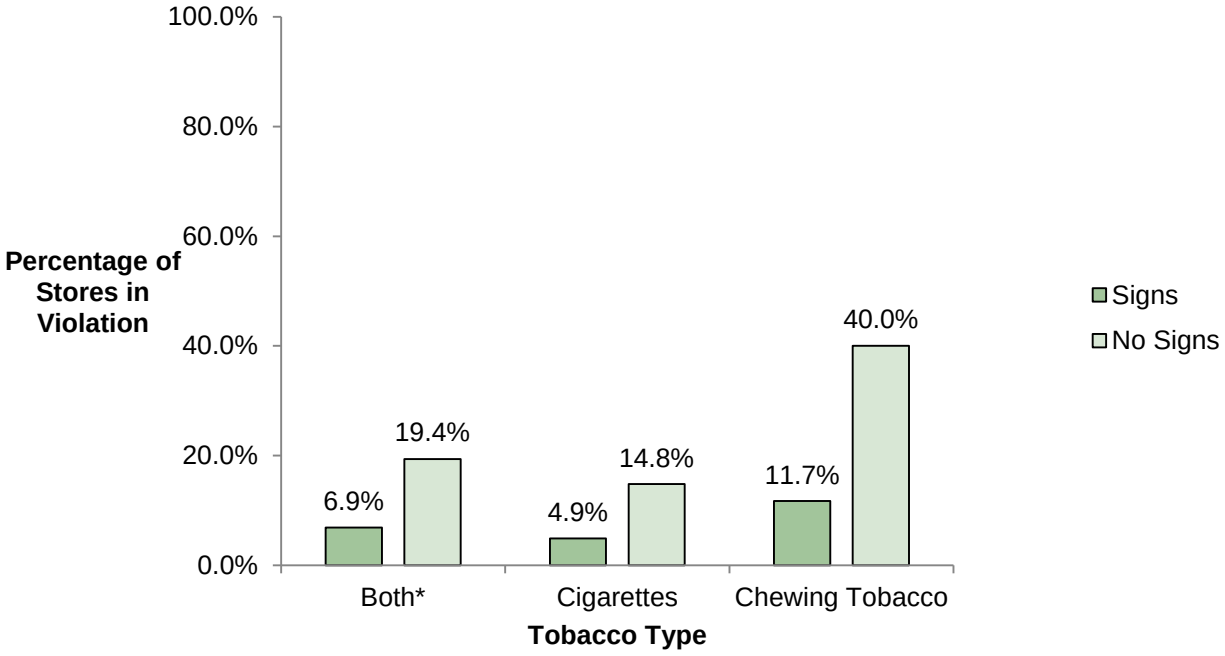


*Indicates statistically significant difference within tobacco type.

Signs Regarding Youth Access to Tobacco

Stores that had signs about the prohibition of tobacco sales to minors had a lower RVR than stores without such signs, when the analysis combined the tobacco types. As with youth inspector age, cigarettes and chewing tobacco showed similar patterns that were not statistically significant (Figure 7). As with youth inspector age, this is likely because of low statistical power, compounded by the low proportion (6.4% of completed inspections) of stores that did not have signs about the prohibition of sales to minors.

Figure 7. Association between Signs regarding Youth Access to Tobacco and Violations

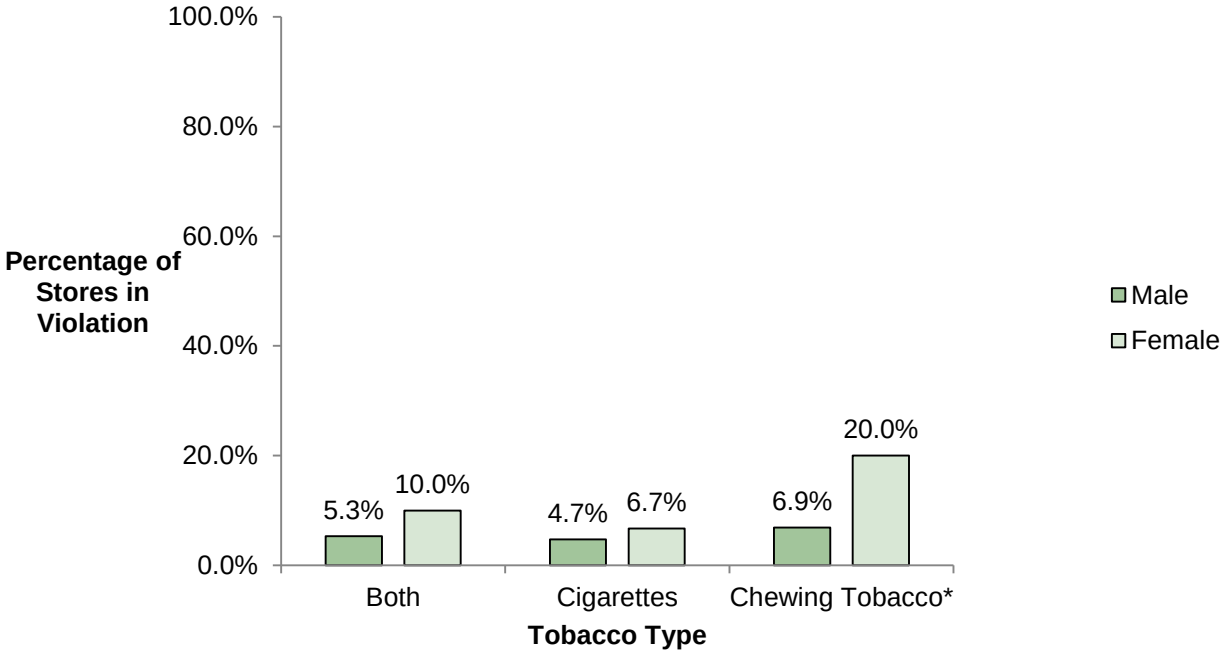


*Indicates statistically significant difference within tobacco type.

Youth Inspector Gender

For chewing tobacco inspections, female youth inspectors were more likely to find clerks willing to sell them the product. Analyses showed similar, but not statistically significant, patterns for cigarette inspections and when inspections were combined. The relationship when inspections were combined was probably not statistically significant because of the relatively weak relationship for cigarette inspections and the high proportion (72.6% of completed inspections) of cigarette inspections.

Figure 8. Association between Youth Inspector Gender and Violations



*Indicates statistically significant difference within tobacco type.

Accessibility of Tobacco

During inspections, youth inspectors were trained to identify the location of cigarettes and chewing tobacco (accessible, not accessible, and youth inspector could not locate) during all inspections. Because a youth inspector's inability to locate a tobacco product is not a definitive indication that a store does not sell that tobacco product, WYSAC treated "could not locate" as missing on that variable. This is a cautious approach to dealing with the unknown location or availability of tobacco products that reduced the statistical power of WYSAC's analyses, making it more difficult to identify a relationship between tobacco accessibility and RVR. This approach diminished the risk of mistakenly identifying a relationship as statistically significant.

It was often difficult for the youth to locate the type of tobacco that was not being targeted for the purchase attempt. It was especially difficult for youth inspectors to visually locate chewing tobacco: 22.4% of all inspections were marked "could not locate" or were otherwise missing data on this variable. In contrast, 8.2% of all inspections were marked "could not locate" or were otherwise missing data on the location of cigarettes.

In addition to the youth inspectors identifying individual tobacco products as accessible, not accessible, or not located, WYSAC created a composite variable for all tobacco accessibility. If any tobacco product was accessible (even if the other type of tobacco was known to be inaccessible or missing), then WYSAC coded that store as having accessible tobacco. When both types of tobacco were known to be inaccessible, WYSAC coded the store as having no accessible tobacco. For all other cases (e.g., one tobacco product inaccessible and the other unknown), WYSAC coded the store as unknown and treated the response as missing. As with the approach to unknown accessibility and missing data for individual types of tobacco, this cautious approach reduced the statistical power of WYSAC's analyses and diminished the risk of mistakenly identifying a relationship as statistically significant. Few (3.2%) of stores had some or all tobacco accessible to customers.

For all inspections (tobacco types combined), there was not a statistically significant relationship between the composite variable of tobacco accessibility and RVR. The RVR for stores that had some (or all) tobacco accessible to customers was 7.7%, compared to 2.9% for stores that had no tobacco accessible to customers.

Because RVR and other relationships varied by tobacco type, WYSAC hypothesized that a store's likelihood of being willing to sell a given tobacco product would be more strongly related to the accessibility of that tobacco product than the overall accessibility of tobacco products. Therefore, WYSAC analyzed the relationships between cigarette and chewing tobacco violations and accessibility based on the individual items about accessibility of the corresponding tobacco product.

For cigarette inspections, 2.6% of stores had cigarettes accessible to customers. There was not a statistically significant relationship between the accessibility of cigarettes and RVR. The RVR for stores that had cigarettes accessible to customers was 0.0%, compared to 2.7% for stores that did not have cigarettes accessible to customers.

For chewing tobacco inspections, 1.5% of stores had chewing tobacco accessible to customers. There was a statistically significant relationship between the accessibility of chewing tobacco and RVR. The RVR for stores that had chewing tobacco accessible to customers (11.8%) was higher than the RVR for stores that did not have chewing tobacco accessible to customers (0.0%).

4.2.4. Significant Associations with Violations: Logistic Regression Models

Logistic regression allows for testing the relative effects between RVR and multiple predictors simultaneously and controlling for the effects of other predictors in logistic regression models. WYSAC developed three logistic regression models: one that combined tobacco types to maximize statistical power and models specific to each tobacco type because of the differences in RVR and other results (see Section 4.2.3). Because of the large amount of missing data on indicators of tobacco accessibility, WYSAC did not include those indicators in the model building process. Doing so would have greatly reduced the number of stores eligible for inclusion (WYSAC omitted cases with any missing data) and, thus, reduced the validity of the resulting models. The logistic regression models confirmed what was clear in the crosstab analyses reported in section 4.2.3 (above): clerks not asking for identification was by far the most powerful predictor of violations for all types of tobacco (combined and separately) followed by rural strata for chewing tobacco inspections and both inspection types combined (but not cigarette inspections). Because the results of the logistic regression models do not add insight to the conclusions from the crosstabs analyses, WYSAC does not report details of the models in this report. They are available upon request.

5. Conclusions

For the 2013 (FFY 2014) Synar Inspection Study, the coverage rate was 83.4%. SAMHSA *requires* that states have at least an 80.0% coverage rate, and *recommends* that states have at least a 90.0% coverage rate (SAMHSA, 2006). Wyoming's rate of 83.4% met the required threshold, but did not meet the recommended threshold. The 95% Wald confidence interval for the coverage rate overlapped with SAMHSA's required threshold, suggesting Wyoming may benefit from improving the coverage of the list frame. According to SAMHSA's guidelines, Wyoming can continue to use the tobacco retailer list frame to conduct the 2014 (FFY 2015) Synar Inspection Study and will need to conduct another coverage study in 2016 (FFY 2017). The 2013 coverage rate is slightly lower than the coverage rate of 88.6% in 2010 (WYSAC, 2010). The confidence intervals for the two years overlap, meaning this decline was not statistically significant. The relatively low 2013 coverage rate for rural stores is the primary contributor to this decline. In 2010, the coverage rate for rural stores was 88.0%, compared to 72.4% in 2013. In contrast, the coverage rate for urban stores *increased* slightly from 90.4% in 2010 to 92.6% in 2013. Wyoming's coverage rate would most benefit from efforts to improve the list frame's coverage of rural stores. Any efforts to improve the coverage of the list frame should also include efforts to improve the accuracy of the list frame, especially for rural stores.

For the 2013 (FFY 2014) Synar Inspection Study, the RVR was 7.6%, below the federally stipulated maximum of 20.0%, even when accounting for error with a 95% confidence interval (one- or two-sided). Despite changes to methods over time (e.g., adding chewing tobacco inspections at multiple proportions of the total number of inspections, changing methods used to recruit youth inspectors), the RVR has generally been between 6% and 10% since 2000 (FFY 2001). The one exception was a 14.4% RVR in 2012 (FFY 2013) that was heavily influenced by one inspection trip with a high RVR (WYSAC, 2012).

Despite the changes to methods over time, several variables related to clerks' willingness to sell tobacco products to minors have remained stable. As in previous years, the single variable most associated with violations remains clerks asking for identification. Few clerks who ask for identification are willing to sell tobacco products to youth who do not produce identification. Older perceived or actual (depending on year) age of youth inspectors has also consistently been associated with violations.

Although recent inspections have not found this to be the case (e.g., WYSAC 2010, 2011, 2012), rural stores had a higher RVR than urban stores in 2013. Because of this and the lower coverage rate for rural stores, WYSAC suggests continuing with the current, CSAP-approved sampling method that oversamples rural stores (relative to optimal allocation for a stratified sample).

Since WYSAC first included chewing tobacco inspections, results comparing RVR for cigarettes and chewing tobacco have been inconsistent. In 2010 and 2012, the RVRs for cigarettes and chewing tobacco were not statistically significantly different. In 2011 and 2013, they were statistically significantly different. Because of this instability, WYSAC suggests continuing with the current ratio of cigarette to chewing tobacco inspections to provide WDH with data that could be used to identify strategies to reduce the RVR for chewing tobacco inspections. This approach would allow WYSAC to continue to identify different predictors of RVR for the different tobacco types.

In 2013 (FFY 2014), the following conclusions were dependent on type of tobacco (only the statistically significant relationships are repeated here):

- For the overall (both tobacco types combined) RVR and for cigarettes, there was a statistically significant relationship between adult supervisors and RVR.
- For the overall RVR, 17-year-old inspectors had a higher RVR than 16-year-old inspectors.
- Overall, stores without signs regarding youth access to tobacco products had a statistically significantly higher RVR than stores that did have signs.
- For chewing tobacco inspections, female youth inspectors had a higher RVR than males.
- For chewing tobacco inspections, stores that had chewing tobacco accessible to customers had a higher RVR than stores that did not have it accessible. However, very few stores had accessible chewing tobacco.

In 2009 (FFY 2010) and 2010 (FFY 2011), WYSAC created logistic regression models to determine the most influential factors in predicting whether clerks would attempt to sell tobacco products to minors when accounting for the effects of other variables. In 2011 (FFY 2012), clerks asking for identification and their willingness to sell were almost perfectly correlated (only one clerk who asked for identification was willing to sell a tobacco product), so WYSAC created a model that used asking for identification as a proxy for willingness to sell. In 2012 (FFY 2013), the association between the two variables was not sufficient to treat asking for identification as a proxy for willingness to sell, but the association was too strong to allow for the development of useful logistic regression models for predicting violations. In 2013 (FFY 2014), WYSAC again developed logistic regression models, but they did not provide information about predicting violations that was not demonstrated through the crosstabs analyses.

As in 2012 (FFY 2013), WYSAC analyzed the possible influence of adult supervisors on the results of inspections. Although analyses showed that two adult supervisors were associated with atypical RVRs in 2013 (FFY 2014), WYSAC cannot rule out youth or geographic factors because of the small number of inspection teams, the fact that each pair of youth worked within limited geographical regions, and the fact that only one pair of youth inspectors worked with more than one driver. In future years, WYSAC can continue to analyze results to identify potential influences of adult supervisors or specific trips on the statewide RVR.

The results of the 2013 (FFY 2014) Synar Coverage and Inspection Studies identify a few areas for potential improvement. First, the results of the Coverage Study identify a need to improve the coverage of rural retailers in the sampling frame. Second, the Inspection Study results suggest areas of intervention to maintain or improve the low RVR. Training efforts could include training clerks to ask all customers for identification before selling them tobacco products. These trainings may want to focus on clerks working in rural areas, female customers, and customers purchasing chewing tobacco. Additionally, educational efforts regarding placing tobacco out of customers' reach may benefit the Synar RVR and compliance with federal regulations about the placement of tobacco products (FDA 2010b). In future years, WYSAC can monitor for changes in the prevalence of signage and the relationship between signage and RVR.

6. References

Agresti, A. (2007). *An introduction to categorical data analysis* (2nd Edition). Hoboken, NJ: John Wiley & Sons, Inc.

Family Smoking Prevention and Tobacco Control and Federal Retirement Reform, Pub. L. No. 111-31-June22, 2009. Retrieved September 20, 2011, from http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_public_laws&docid=f:publ031.111.pdf

Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Prevention. (2006). *Guide for a Synar sampling frame coverage study.* Retrieved July 14, 2010, from http://download.ncadi.samhsa.gov/csap/CSAPCoverageStudyGuide-2006.pdf

Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Prevention. (2010). *Implementing the Synar regulation: Tobacco store inspection.* Retrieved October 1, 2010 from CSAP's State Online Resource Center (SORCE) http://sorce.e-prevention.org

Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Prevention. (2011a). *Implementing the Synar regulation: Sample Design Guidance.* Washington, D.C.: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration

Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Prevention. (2011b). *Synar Survey Estimation System: Draft version 5.0: User manual.* Retrieved September 19, 2011, from CSAP's State Online Resource Center (SORCE) http://sorce.e-prevention.org

University of Medicine and Dentistry of New Jersey -School of Public Health. (2006). *Tobacco surveillance data brief: Cigars and smokeless tobacco*, Volume 1, Issue 4. Retrieved September 22, 2011, from http://www.state.nj.us/health/as/ctcp/documents/cigars_smokeless_tobacco_brief06.pdf

U.S. Food and Drug Administration. (2010a). *Light, low, mild, or similar descriptors.* Retrieved October 15, 2010, from http://www.fda.gov/TobaccoProducts/Labeling/MisleadingDescriptors/default.htm

U.S. Food and Drug Administration. (2010b). *Protecting kids from tobacco: Regulations restricting the sale and distribution of cigarettes and smokeless tobacco to protect children and adolescents*. Retrieved September 22, 2011, from http://www.fda.gov/TobaccoProducts/ProtectingKidsfromTobacco/RegsRestrictingSale/ucm204589.htm#Advertising

WYSAC. (2007). *Wyoming's 2007 Synar tobacco compliance report,* by T. C. Cook & L. H. Despain. (WYSAC Technical Report No. CHES-721). Laramie, WY: Wyoming Survey & Analysis Center, University of Wyoming.

WYSAC. (2010). Wyoming's 2010 Synar tobacco compliance report: Coverage and inspection studies, by T. C. Cook, L. H. Despain, & O. Wasilik. (WYSAC Technical Report No. CHES-1011). Laramie, WY: Wyoming Survey & Analysis Center, University of Wyoming.

WYSAC. (2011). *Wyoming's 2011 Synar tobacco compliance report,* by L. H. Despain, & A. Cisler. (WYSAC Technical Report No. CHES-1114). Laramie, WY: Wyoming Survey & Analysis Center, University of Wyoming.

WYSAC. (2012). *Wyoming's 2012 (FFY 2013) Synar tobacco compliance report,* by L. H. Despain, O. Dziadkowiec, & P. T. Grandjean. (WYSAC Technical Report No. DER-1242). Laramie, WY: Wyoming Survey & Analysis Center, University of Wyoming.

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7. Appendices

Appendix A. Detailed Calculations for the Coverage Study

A.1. Coverage Study Sampling Design

WYSAC used the instructions and formulas presented in SAMHSA's *CSAP Guide for a Synar Sampling Frame Coverage Study* (2006, p. 13-14) to allocate the sample to two strata and optimize costs:

$$n_{urban} = n\frac{N_{urban} * S_{urban}}{N_{urban} * S_{urban} + \frac{N_{rural}S_{rural}}{\sqrt{a^{-1}}}}$$

and

$$n_{rural} = n - n_{urban}$$

where

$$a^{-1} = \frac{cost_{rural}}{cost_{urban}}$$

In this equation, n is the target sample size, n_{urban} is the sample size for the urban strata, N_{urban} is the estimated population size for the urban stratum, S_{urban} is the standard deviation in the urban stratum, N_{rural} is the estimated population size for the rural stratum, S_{rural} is the standard deviation in the rural stratum, and a^{-1} is the cost ratio of canvassing a rural tract over the cost of canvassing an urban tract.

Consistent with SAMHSA's guidance on total sample size (2006, p. 11), WYSAC set the target sample size at 120 stores. Substituting the estimated values for the 2010 coverage study, WYSAC found

$$n_{urban} = 120\frac{375 * 0.295}{375 * 0.295 + \frac{145*0.326}{\sqrt{\frac{3}{1}}}} = 96.3$$

and

$$n_{rural} = 120 - 96.3 = 23.7$$

Using the 2013 Synar tobacco retailer list frame, WYSAC determined that Wyoming has an average of 4 tobacco retail stores per census tract (520 stores / 130 tracts). Extrapolating the above target sample sizes to target sample sizes in census tracts and rounding to whole numbers, WYSAC found

$$\frac{96.3\ urban\ outlets}{4\ outlets\ per\ tract} \cong 25\ urban\ tracts;\ \frac{23.7\ rural\ outlets}{4\ outlets\ per\ tract} \cong 6\ rural\ tracts$$

and drew a stratified random sample accordingly.

A.2. Coverage Rate Calculations

The un-weighted coverage formula from the *CSAP Guide for a Synar Sampling Frame Coverage Study* (2006, p. 15) is given by the following general equation:

$$C = 100 \times \frac{b}{n}$$

In this equation, b is the number of stores from the tobacco retailer list frame found by the coverage study and n is the total number of stores found by the coverage study (regardless of whether they were on the list frame). Because the 2013 coverage study used a stratified sample, WYSAC needed to calculate a weighted coverage rate. The equation with weighting is (SAMHSA, 2006, p 15):

$$C = 100 \times \frac{\sum_{i=1}^{k} w_i b_i}{\sum_{i=1}^{k} w_i n_i}$$

In this equation, b_i is the number of stores from the tobacco retailer list frame found in each stratum, n_i is the number of stores found by the coverage study in each stratum, and w_i is the stratum weight, calculated by the following equation (SAMHSA, 2006, p 15):

$$w_i = \frac{K_i}{k_i}$$

In this equation, k_i is the number of areas selected for coverage in a stratum and K_i is the number of areas in the stratum.

For the 2013 coverage study, the equation expanded as follows:

$$C = 100 \times \frac{w_{urban} b_{urban} + w_{rural} b_{rural}}{w_{urban} n_{urban} + w_{rural} n_{rural}}$$

or

$$C = 100 \times \frac{\frac{K_{urban}}{k_{urban}} \times b_{urban} + \frac{K_{rural}}{k_{rural}} \times b_{rural}}{\frac{K_{urban}}{k_{urban}} \times n_{urban} + \frac{K_{rural}}{k_{rural}} \times n_{rural}}$$

WYSAC calculated the 2013 Synar weighted coverage rate:

$$C = 100 \times \frac{\frac{79}{25} \times 88 + \frac{52}{6} \times 21}{\frac{79}{25} \times 95 + \frac{52}{6} \times 29} = 83.4\%$$

This equation gave a final weighted coverage rate of 83.4%, with a 95% Wald confidence interval of 79.7% to 86.0%, above the SAMHSA required threshold of 80.0% (SAMHSA, 2006).

WYSAC also calculated separate coverage rates for each stratum:

$$C_{urban} = 100 \times \frac{b_{urban}}{n_{urban}} = \frac{88}{95} = 92.6\%$$

$$C_{rural} = 100 \times \frac{b_{rural}}{n_{rural}} = \frac{21}{29} = 72.4\%$$

The coverage rate for the urban stratum was above the SAMHSA required threshold of 80.0%, but the coverage rate for the rural stratum did not meet this threshold. The rates for the two strata were significantly different, χ^2 (1, N = 551.5) = 40.4, $p < .001$. The coverage rate for rural stores was substantially lower than that for the urban stores.

A.3. Accuracy Rate Calculations

To calculate the accuracy of the tobacco retailer list frame, WYSAC compared the coverage study results to the list frame. WYSAC followed SAMHSA's definition of accuracy: WYSAC considered a store's information 100% accurate if the tobacco retailer list frame information would allow field workers to easily locate the store. While calculating accuracy, WYSAC only included stores covered by the inspection list frame. If the coverage study address and the list frame address were identical, the store was accurate. If the coverage study listed a different *name* than the list frame, WYSAC still considered the store accurate because the name change would not prevent somebody from locating it. The un-weighted accuracy is given by the following equation:

$$A = 100 \times \frac{a}{b}$$

In this equation, A is the un-weighted accuracy of tobacco retailer list frame addresses, a is the number of stores found by the coverage study with accurate addresses, and b is the number of stores from the tobacco retailer list frame found by the coverage study (the coverage rate formulas above). Because the coverage study used a stratified sample, WYSAC needed to calculate a weighted accuracy rate. Thus, WYSAC calculated a weighted accuracy for the list frame addresses with the following equation, based on the weighted coverage rate equation for the coverage study (above):

$$A = 100 \times \frac{w_{urban}a_{urban} + w_{rural}a_{rural}}{w_{urban}b_{urban} + w_{rural}b_{rural}}$$

or

$$A = 100 \times \frac{\frac{K_{urban}}{k_{urban}} \times a_{urban} + \frac{K_{rural}}{k_{rural}} \times a_{rural}}{\frac{K_{urban}}{k_{urban}} \times b_{urban} + \frac{K_{rural}}{k_{rural}} \times b_{rural}}$$

In this equation, k_i is the number of areas selected for coverage in a stratum, K_i is the number of areas in the stratum, a_i is the number of stores with accurate list frame addresses found by the coverage study in each stratum, and b_i is the number of stores from the tobacco retailer list frame found in each stratum (the coverage rate formulas above). Substituting the values for the coverage study, WYSAC found:

$$A = 100 \times \frac{\frac{79}{25} \times 88 + \frac{52}{6} \times 18}{\frac{79}{25} \times 88 + \frac{52}{6} \times 21} = 94.3\%$$

Thus, the weighted accuracy for the list frame was 94.3%, with a 95% Wald confidence interval of 91.6% to 96.0%. WYSAC also calculated accuracy rates specific to each stratum using the following equations:

$$A_{urban} = 100 \times \frac{a_{urban}}{b_{urban}} = \frac{88}{88} = 100.0\%$$

$$A_{rural} = 100 \times \frac{a_{rural}}{b_{rural}} = \frac{18}{21} = 85.7\%$$

Mirroring results for the weighted coverage rate, the list frame information was less accurate for the rural stratum, Fisher's exact test, $p = <.001$.

Appendix B. Synar Inspection 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.

Appendix C. Synar Inspection Study Results

For every question on the 2013 (FFY 2014) Synar Inspection Form, WYSAC provides the unweighted frequencies, unweighted percentages, and weighted percentages (except items 6 and 7, which ask about eligibility and inspection status, respectively) in this appendix. Of the 409 outlets in the sample, 28 were *ineligible* (see items 6 and 6a). Another 11 outlets were eligible, but *not inspected* (see items 7 and 7a). WYSAC coded two additional outlets as eligible, but not inspected because they were missing responses to the item asking about whether the inspection resulted in a violation. Thus, WYSAC has a *valid* total of 368 inspected outlets for inclusion in analyses. For every question (except for 6 and 7), WYSAC only reports information for the 368 stores included in the analyses. For questions 6 and 7, WYSAC provides information on all 409 stores in the sample and does not provide weighted percentages. Because of rounding, not all percentages add to 100.0%. Because analyses in the report omitted outlets with missing data on specific items (e.g., 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), reported percentages in this appendix may differ from those reported in the body of the report. For items with missing data, WYSAC provides explanations and unweighted frequencies of missing data.

1. Inspection month

	Frequency	Valid, unweighted percent	Valid, weighted percent
July	180	48.9	47.0
August	188	51.1	53.0
Valid total	368	100.0	100.0

2. Time of visit

	Frequency	Valid, unweighted percent	Valid, weighted percent
AM	208	56.5	57.5
PM	160	43.5	42.5
Valid total	368	100.0	100.0

3. Age of youth inspector

	Frequency	Valid, unweighted percent	Valid, weighted percent
Stores inspected by 16-year-olds	148	40.2	40.1
Stores inspected by 17-year-olds	220	59.8	59.9
Valid total	368	100.0	100.0

4. Gender of youth inspector

	Frequency	Valid, unweighted percent	Valid, weighted percent
Stores inspected by males	184	50.0	50.3
Stores inspected by females	184	50.0	49.7
Valid total	368	100.0	100.0

5. Outlet county

	Frequency	Valid, unweighted percent	Valid, weighted percent
Laramie	39	10.6	11.4
Natrona	34	9.2	9.9
Fremont	27	7.3	7.5
Carbon	25	6.8	6.6
Sweetwater	23	6.3	6.5
Albany	21	5.7	6.2
Lincoln	21	5.7	4.5
Campbell	20	5.4	6.1
Teton	20	5.4	5.6
Park	18	4.9	5.2
Sheridan	17	4.6	4.8
Uinta	17	4.6	4.5
Crook	14	3.8	3.0
Sublette	11	3.0	2.3
Big Horn	10	2.7	2.1
Johnson	9	2.4	2.6
Converse	8	2.2	2.2
Platte	8	2.2	2.1
Goshen	7	1.9	1.9
Washakie	6	1.6	1.7
Weston	6	1.6	1.6
Niobrara	4	1.1	0.9
Hot Springs	3	0.8	0.9
Valid Total	368	100.0	100.0

6. Was the outlet (store) eligible for an inspection?

	Frequency	Valid, unweighted percent
Yes	381	93.2
No	28	6.8
Valid total	409	100.0

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

6a. If NO, mark one of the following reasons the store was ineligible for inspection:

	Frequency	Valid, unweighted percent
Inaccessible to youth	7	25.0
Out of business	6	21.4
Does not sell tobacco products	6	21.4
Could not locate	5	17.9
Temporary closure	2	7.1
Duplicate	1	3.6
Other (specify):	1	3.6
Valid total	28	100.0

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

"Other" response:

- Membership required to enter store

7. If outlet is eligible, was inspection completed?

	Frequency	Valid, unweighted percent
Yes	368	96.6
No	11	2.9
Inspection completed, but missing data on outcome of inspection (violation/nonviolation)*	2	0.5
Valid total	381	100.0
Ineligible	28	
Total	409	

** Per CSAP guidelines, WYSAC treated these two stores as eligible, incomplete in all analyses.*
Note. Includes all tobacco retailers in the sample, unlike the majority of tables in this Appendix.

7a. 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	4	36.4
Both youth inspectors knew someone in the store	1	9.1
Other (specify): *see below*	6	54.5
Valid total	11	100.0

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

"Other" response:

- No employees available to ask (2)
- Lane closed (1)
- Only sold tobacco in the liquor store (1)
- No support from local law enforcement (2)

8. Type of store

	Frequency	Valid, unweighted percent	Valid, weighted percent
Convenience (with gas)	256	69.6	69.5
Grocery store	54	14.7	14.2
Discount / Superstore (e.g., Wal-Mart, Target)	20	5.4	5.9
Convenience (no gas)	13	3.5	3
Pharmacy / Drug store	8	2.2	2.4
Tobacco store	6	1.6	1.8
Restaurant / Cafe	4	1.1	0.9
Other (specify):	7	1.9	2.1
Valid total	368	100.0	100.0

"Other" responses:

- Book/tobacco store (1)
- Co-Op (1)
- Motel (1)
- Newsstand/bookstore (1)
- Novelty store (1)
- Pawn Shop (1)
- Specialty store (1)

9. Location of cigarettes

	Frequency	Valid, unweighted percent	Valid, weighted percent
Not accessible (customers require assistance from an employee to obtain cigarettes)	332	97.9	
Accessible (customers can pick up a pack of cigarettes without the assistance of an employee)	7	2.1	
Valid total	339	100.0	100.0
Missing data	29		
Total	368		

10. Location of chewing tobacco

	Frequency	Valid, unweighted percent	Valid, weighted percent
Accessible (customers can pick up a pack of cigarettes without the assistance of an employee)	7	2.4	2.3
Not accessible (customers require assistance from an employee to obtain cigarettes)	281	95.6	95.7
Youth Inspector Could Not Locate	6	2	2
Valid total	294	100.0	100.0
Cigarette inspections with no answer on chewing tobacco location	74		
Total	368		

Constructed variable. Overall tobacco accessibility

	Frequency	Valid, unweighted percent	Valid, weighted percent
Cigarettes and/or chewing tobacco accessible (customers can pick up tobacco products without the assistance of an employee)	9	3.4	3.4
Neither cigarettes nor chewing tobacco accessible (customers require assistance from an employee to obtain tobacco products)	252	96.6	96.6
Valid Total	261	100.0	100.0
Missing data (includes outlets with unknown accessibility of either or both tobacco types)	107		
Total	368		

Note. Treating "youth inspector could not locate" as missing data is a cautious approach: WYSAC does not know if an outlet sold the type of tobacco that was not the target of the inspection. Youth inspectors may have not seen the product, but it could still be for sale. Treating this response as an indication that the store did not sell that product (and, hence, it would not be accessible) risks false negatives. Treating this response as missing or valid data did not affect the conclusions in the report.

11. Were there any youth access signs present in the store (e.g. "No Sales to Minors")?

	Frequency	Valid, unweighted percent	Valid, weighted percent
Yes	343	93.5	93.6
No	24	6.5	6.4
Valid total	367	100.0	100.0
No answer	1		
Total	368		

12. Clerk gender

	Frequency	Valid, unweighted percent	Valid, weighted percent
Female	99	26.9	28
Male	269	73.1	72
Valid total	368	100.0	100.0

13. Approximate age of clerk

	Frequency	Valid, unweighted percent	Valid, weighted percent
Under 18	1	0.3	0.2
18-24	61	16.6	16.9
25-34	103	28	29.2
35-44	59	16	16.1
45-54	70	19	17.8
55-64	48	13	12.8
65-85	24	6.5	6.3
Valid total	368	100.0	100.0

14. If inspection was completed, was buy attempt successful?

	Frequency	Valid, unweighted percent	Valid, weighted percent
Yes (violation)	32	8.7	7.6
No (nonviolation)	336	91.3	92.4
Valid total	368	100.0	100.0

14a. If YES, how much was the pack/can?

	Frequency	Valid, unweighted percent	Valid, weighted percent
$2.00-4.50	8	25	24.7
$4.51-4.90	5	15.6	17.6
$4.91-5.49	11	34.4	33.1
$5.50-8.00	6	18.8	16.7
Valid Total	30	100.0	100.0
Missing	2		
Not applicable, non-violation	336		
Total	368		

Constructed variable. If YES, how much was the pack of cigarettes?

	Frequency	Valid, unweighted percent	Valid, weighted percent
$2.00-4.50	1	5.9	5.2
$4.51-4.90	4	23.5	27.7
$4.91-5.49	7	41.2	41
$5.50-8.00	5	29.4	26.1
Valid Total	17	100.0	100.0
Not Applicable, nonviolation	252		
Not applicable, chewing tobacco inspection	99		
Total	368		

Constructed variable. If YES, how much was the can of chewing tobacco?

	Frequency	Valid, unweighted percent	Valid, weighted percent
$2.00-4.50	7	46.7	47
$4.51-4.90	1	6.7	6
$4.91-5.49	4	26.7	23.9
$5.50-8.00	1	6.7	6
Valid Total	15	100.0	100.0
Missing	2		
Not applicable, nonviolation	84		
Not applicable, cigarette inspection	269		
Total	368		

15. What type of tobacco did the youth inspector ask for? (Every third inspection should be for chewing tobacco.)

Tobacco type	Frequency	Valid, unweighted percent	Valid, weighted percent
Cigarettes	269	73.1	72.6
Chewing tobacco	99	26.9	27.4
Valid total	368	100.0	100.0

16. What tobacco brand was attempted to be purchased?

Tobacco type	Tobacco brand	Frequency	Valid, unweighted percent	Valid, weighted percent
Cigarettes	Marlboro Gold	258	70.1	69.5
	Marlboro	3	0.8	0.8
	Camel Blue	5	1.4	1.4
	Camel	3	0.8	0.8
Smokeless tobacco	Skoal Wintergreen	92	25	25.5
	Copenhagen Wintergreen	7	1.9	1.9
Valid total		368	100.0	100.0

17. Did the clerk ask for youth's ID?

	Frequency	Valid, unweighted percent	Valid, weighted percent
Yes	326	89.1	90
No	40	10.9	10
Valid total	366	100.0	100.0
No answer	2		
Total	368		

18. Did the clerk ask for youth's age?

	Frequency	Valid, unweighted percent	Valid, weighted percent
No	31	8.6	8.2
Yes	331	91.4	91.8
Valid total	362	100.0	100.0
No answer	6		
Total	368		

Appendix D. Detailed Calculations for the 2013 (FFY 2014) Synar Inspection Study

D.1. Inspection Study Sampling Design

Tables C-1 and C-2 provide information on the sample sizes for the two strata, depicting output from the SSES Sample Size Calculator. WYSAC entered several variables (under "Input Information" in each table). An explanation of each 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). The original list frame had 389 urban municipality outlets and 138 rural municipality outlets.
- **Expected Retailer Violation Rate (RVR)** is the weighted RVR from last year's survey. Again, the weighted RVR is specific for each stratum. The rural municipality RVR from last year, 2011, was 8.6% and the urban municipality RVR from last year, 2011 (FFY 2012)
- **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 both strata was 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. The expected accuracy rate for the rural stratum was 92.8% and 87.6% for the urban 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. The expected completion rate for the rural stratum was 88.1% and 85.9% for the urban 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 used 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. Definitions for each of these outputs follow. Numerical values are in Tables C-1 (rural strata) and C-2 (urban strata).

- **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 both 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 D-1. SSES Sample Size Output for the *Rural* Sampling Frame

Synar Survey

State	Rural WY
FFY	2014
Date	6/19/2013 14:13

Input Information

Option for 95% Confidence Interval	One-Sided
Outlet Frame Size	147
Expected Retailer Violation Rate	15.30%
Design Effect	1
Expected Accuracy Rate	92.80%
Expected Completion Rate	95.70%
Safety Margin Used	20%

Sample Size

Effective Sample Size	107
Target(Minimum) Sample Size	107
Planned Original Sample Size	145

- Table D-2. SSES Sample Size Output for the *Urban* Sampling Frame

Synar Survey

State	Urban WY
FFY	2014
Date	6/19/2013 14:15

Input Information

Option for 95% Confidence Interval	One-Sided
Outlet Frame Size	373
Expected Retailer Violation Rate	14.10%
Design Effect	1
Expected Accuracy Rate	87.20%
Expected Completion Rate	97.40%
Safety Margin Used	20%

Sample Size

Effective Sample Size	185
Target(Minimum) Sample Size	185
Planned Original Sample Size	262

Based on the FFY 2014 (calendar year 2013) Synar results, the input values for the FFY 2015 (calendar year 2014) Synar inspections are as follows:

- Rural stratum
    - Expected RVR = 23/132 =17.4%
    - Expected accuracy rate = 136/147= 92.5%
    - Expected completion rate = 132/136= 97.1%
- Urban stratum
    - Expected RVR = 9/236= 3.8%
    - Expected accuracy rate = 245/262= 93.5%
    - Expected completion rate = 236/245= 96.3%

D.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:

$$373\frac{245}{262} + 147\frac{136}{147} = 484.8$$

WYSAC estimated the weighted RVR by

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

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 2013 (FFY 2014) Synar Inspection Study was

$$\left(\frac{9}{236}\right)\left(\frac{245}{262}\right)\left(\frac{373}{484.8}\right) + \left(\frac{23}{132}\right)\left(\frac{136}{147}\right)\left(\frac{147}{484.8}\right) = .076\ or\ 7.6\%$$

D.3. Analyses of Associations with Retailer Violations

The tables below 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). The blue shading in each table indicates conclusions that were not consistent across tobacco type. Italics indicate statistically significant findings.

Table D-3. Tested Associations with Retailer Violation: Tobacco, Cigarettes and Chewing Tobacco Combined .

Variable	χ^2	Degrees of freedom	Weighted number of outlets included in analysis	Statistical significance (*p*)	Higher RVR situation*
Type of tobacco	*6.9*	*1*	*485*	*.009*	*Chewing tobacco*
Ask for identification	*209.2*	*1*	*482*	*<.001*	*Not asking for identification*
Rural/Urban stratum	*26.8*	*1*	*484*	*<.001*	*Rural*
Adult supervisor	*12.7*	*4*	*486*	*.013*	*1 adult supervisor (an additional adult supervisor had a low RVR)*
Youth inspector age	*4.1*	*1*	*484*	*.042*	*17 years old*
Youth access signs	*6.4*	*1*	*483*	*.011*	*No signs*
Youth inspector gender	3.7	1	485	.055	Female
Accessibility of any tobacco product, dichotomized	*Fisher's exact test, one-tailed†*		*93*	*.015*	*Accessible tobacco*
Month of inspection	0.3	1	485	.582	July
Time of inspection	1.3	1	485	.256	Afternoon
Perceived age of youth inspector, dichotomized	3.4	1	448	.065	18 or older
Store type, dichotomized	0.8	1	485	.365	Not a convenience store
Clerk gender	.4	1	485	.536	Male
Estimated clerk age, 35 and younger vs. older than 35, a median split	.03	1	482	.863	16–35 years old
Ask age	Fisher's exact test, one-tailed†		476	.359	Not asking for age

*The higher RVR situation for nonsignificant associations is provided for informational purposes only, not for interpretation.

† Conclusions would have been the same with two-tailed tests or Pearson's chi-squared.

Note. The number of outlets included in analyses varies because of weighting and missing data. As in the report, WYSAC dichotomized perceived age of youth inspector (18 or older vs. younger than 18), store type (convenience with or without gas vs. all others), and tobacco accessibility (all accessible vs. at least some accessible). Italics indicate statistically significant findings.

Table D-4. Tested Associations with Retailer Violation: Cigarettes Only.

Variable	χ^2	Degrees of freedom	Weighted number of outlets included in analysis	Statistical significance (*p*)	Higher RVR situation*
Ask for identification	*129.4*	*1*	*350*	*<.001*	*Not asking for identification*
Rural/Urban stratum	*10.6*	*1*	*351*	*.001*	*Rural*
Adult supervisor	*9.5*	*4*	*354*	*.05*	*1 adult supervisor (an additional adult supervisor had a low RVR)*
Youth inspector age	1.9	1	352	.172	17 years old
Youth access signs	*4.5*	*1*	*351*	*.033*	*No signs*
Youth inspector gender	0.7	1	352	.414	Female
Accessibility of cigarettes, dichotomized	Fisher's exact test, one-tailed†		351	.586	Accessible
Month of inspection	.4	1	352	.509	August
Time of inspection	0.2	1	352	.623	Afternoon
Perceived age of youth inspector, dichotomized	Fisher's exact test, one-tailed†		352	.264	18 or older
Store type, dichotomized	0.3	1	352	.582	Not a convenience store
Clerk gender	0.2	1	351	.693	Male
Estimated clerk age, 35 and younger vs. older than 35, a median split	0.8	1	350	.385	16–35 years old
Ask age	Fisher's exact test, one-tailed†		346	.245	Asking for age

*The higher RVR situation for nonsignificant associations is provided for informational purposes only, not for interpretation.

† Conclusions would have been the same with two-tailed tests or Pearson's chi-squared.

Note. The number of outlets included in analyses varies because of weighting and missing data. As in the report, WYSAC dichotomized perceived age of youth inspector (18 or older vs. younger than 18), store type (convenience with or without gas vs. all others), and tobacco accessibility (all accessible vs. at least some accessible). Italics indicate statistically significant findings.

Table D-5. Tested Associations with Retailer Violation: Chewing Tobacco Only.

Variable	χ^2	Degrees of freedom	Weighted number of outlets included in analysis	Statistical significance (*p*)	Higher RVR situation*
Ask for identification	*Fisher's exact test, one-tailed†*		*133*	*<.001*	*Not asking for identification*
Rural/Urban stratum	*18.7*	*1*	*133*	*<.001*	*Rural*
Adult supervisor	2.6	4	134	.619	*2 adult supervisors (an additional adult supervisor had a low RVR)*
Youth inspector age	Fisher's exact test, one-tailed†		133	.089	17 years old
Youth access signs	3.5	1	133	.063	No signs
Youth inspector gender	*5.0*	*1*	*132*	*.026*	*Female*
Accessibility of chewing tobacco, dichotomized	*Fisher's exact test, one-tailed†*		*131*	*.016*	*Accessible*
Month of inspection	2.6	1	133	.109	July
Time of inspection	0.6	1	132	.436	Afternoon
Perceived age of youth inspector, dichotomized	Fisher's exact test, one-tailed†		133	.074	18 or older
Store type, dichotomized	0.9	1	132	.335	Not a convenience store
Clerk gender	<0.1	1	133	.935	Male
Estimated clerk age, 35 and younger vs. older than 35, a median split	0.6	1	132	.440	36 or older
Ask age	Fisher's exact test, one-tailed†		131	.670	Not asking for age

*The higher RVR situation for nonsignificant associations is provided for informational purposes only, not for interpretation.

† Conclusions would have been the same with two-tailed tests or Pearson's chi-squared.

Note. The number of outlets included in analyses varies because of weighting and missing data. As in the report, WYSAC dichotomized perceived age of youth inspector (18 or older vs. younger than 18), store type (convenience with or without gas vs. all others), and tobacco accessibility (all accessible vs. at least some accessible). Italics indicate statistically significant findings.

Appendix E. Information for CSAP's FFY2014 (CY 2013) Annual Synar Report

This appendix provides the information WDH needs to complete the FFY 2014 (calendar year 2013) Annual Synar Report (ASR) for the Substance Abuse and Mental Health Services Administration (SAMHSA). In this appendix, WYSAC provides answers to ASR questions specific to the coverage study and inspections. All other answers are more appropriately determined by WDH. WYSAC is available for technical assistance.

Section I: Question 6–9

- Question 6. No, the sampling methodology has not changed since the 2012 Synar Survey.
- Question 7a. Yes, WYSAC used the optional Synar Survey Estimation System (SSES) to analyze the Synar Survey data. The SSES summary tables are included at the end of this document. WYSAC will also e-mail electronic copies of the SSES output to WDH.
- Questions 7b–7h not required because WYSAC used SSES.
- Question 8. Yes, WYSAC used a list frame.
    - 8a. 2013
    - 8b. 83.4%
    - 8c. Yes
    - 8d. 2016
- Question 9. No, the inspection protocol has not changed since 2012.
    - 9a. WYSAC conducted the inspections between 07/15/13 and 08/16/13.
    - 9b. Eighteen youth inspectors participated in the 2013 Synar Survey (FFY 2014).
    - 9c. Form 5 is not required because WYSAC used SSES.

Section II: Question 1 and 3

- Question 1. No, WYSAC does not anticipate any changes in the Synar sampling methodology or the Synar inspection protocol.
- Question 3. WDH may check the appropriate fields for enforcement, legal, and/or other challenges it faces surrounding the Synar amendment. As far as the inspections, the challenges include the following:
    - Difficulties recruiting youth inspectors, and
    - Issues regarding the age balance of youth inspectors
    - Geographic, demographic, and logistical considerations in conducting inspections.
    - Other challenges: Limited support from law enforcement agencies required to be involved in non-enforcement Synar inspections
- *Briefly describe all checked challenges and propose a plan for each, or indicate the state's need for technical assistance related to each relevant challenge.*
    - *Difficulties recruiting youth inspectors: WYSAC is developing relationships with youth organizations with reach across the state (e.g., 4-H) to develop contacts with youth.*
    - *Issues regarding the age balance of youth inspectors: Approximately 60% of inspections in 2013 (FFY 2014) were conducted by 17-year-olds, the remaining 40% were conducted by 16-year-olds. Although CSAP does not provide guidance for the age balance of inspections, this is on the border of the acceptable range for gender balance. Altering recruitment to balance the age of inspectors would add difficulty to the already difficult task of recruiting youth in a rural state.*

- *Geographic, demographic, and logistical considerations in conducting inspections: Wyoming is one of the most rural states which creates unavoidable logistical issues. WYSAC will continue to use a stratified sample design to maximize efficiency.*
- *Other challenges (Please list.): Limited support from law enforcement agencies required for non-enforcement Synar inspections. WYSAC and the Wyoming Department of Health will discuss alternatives to local Sheriff Offices and Police Departments.*

Appendix A: Forms

- Because WYSAC used SSES, WYSAC does not need to complete these forms. The SSES tables are included at the end of this document. WYSAC will also provide an electronic copy of all SSES tables to WDH.

Appendix B: Questions 1–10

- Question 1. WYSAC used a *list frame* sampling method.
- Question 2: Please see Section 4.1.1 of the report for details. WDH may complete this list as appropriate. Annually, WYSAC updates the list frame from the Synar inspections and, when available, the coverage study.
- Question 3. Skip this question because WYSAC used a list frame, not an area frame.
- Question 4. WYSAC does not include vending machines in the Synar Survey because state law bans them from locations accessible to youth. It may be useful to note that Federal law also bans them from areas accessible to youth.
- Question 5. WYSAC used a *stratified sample* with a *simple random sample*.
- Question 6: Skip this question because WYSAC did not use a systematic sampling method.
- Question 7: Information about stratification:
    - 7a. WYSAC categorized each outlet into one of two strata. WYSAC defined the urban stratum as outlets being located in a town with a population of at least 3,000 and the rural stratum as outlets being located in a town with a population of fewer than 3,000.
    - 7b. WYSAC did not use clustering within the stratified sample.
- Question 8: Skip this question because WYSAC did not use clustering.
- Question 9: WYSAC used SSES to calculate the effective, target, and original sample sizes. WYSAC ran the State Level SSES Sample Size Calculator twice, once for the rural stratum and once for the urban stratum. This increases the sample size and reduces error.
- Question 9c. Skip this question because WYSAC used SSES.
- Question 10a. Skip this question because WYSAC used a stratified sample.
- Question 10b.
    - For the rural stratum
        - RVR: 15.3%
        - Frame Size: 147
        - Design Effect: 1
        - Safety Margin: 20%
        - Accuracy (Eligibility) Rate: 92.8%
        - Completion Rate: 95.7%
    - For the urban stratum
        - RVR: 14.1%
        - Frame Size: 373

  - Design Effect: 1
  - Safety Margin: 20%
  - Accuracy (Eligibility) Rate: 87.2%
  - Completion Rate: 97.4%
- Question 10c. Skip this question because WYSAC used SSES.

Appendix C: Questions 1–7

Note: WYSAC has attached the Synar inspection form as Appendix F of the technical report and as a separate file. Upload this form to WebBGAS under the heading "Synar Inspection Form." Upload Section 4.1.2 from this report to WebBGAS under the heading "Synar Inspection Protocol."

- Question 1: Wyoming Synar Survey protocol:
  - 1a. Consummated buy attempts are *not permitted*.
  - 1b. Youth inspectors are *not permitted* to carry ID.
  - 1c. Adult inspectors are *permitted* to enter the outlet *under specified circumstances*. Adult inspectors may enter the outlet during early inspections as part of training the youth inspectors or to verify that youth are following protocol if they determine there is a need to do so. They are trained to enter and leave separately from the youth.
  - 1d. Youth inspectors are *required* to be compensated.
- Question 2: The agency that conducts the random, unannounced Synar inspections is a private contractor. The agency name is the Wyoming Survey & Analysis Center (WYSAC) at the University of Wyoming.
- Question 3: The Synar inspections are *never* combined with law enforcement efforts.
- Question 4: During most inspections, youth inspectors attempted to purchase Marlboro Gold cigarettes. When unavailable, females attempted to purchase Camel Blues, and males 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).
- Question 5: WYSAC recruited adults from the Laramie, Wyoming, area to fill the adult supervisor role. Prior to hiring the adult supervisors, WYSAC conducted criminal background checks and reviewed driving records. WYSAC trained all adult supervisors in Synar protocol. The adult supervisors were then responsible for training the youth inspectors. WYSAC recruited most youth inspectors by asking previous buyers to provide referrals. Community prevention professionals administering prevention programming at the county-level also provided contacts. WYSAC first contacted potential youth inspectors via telephone to describe the project and speak with one of their parents or guardians. Once the youth inspector and the parent/guardian expressed interest, WYSAC sent them a written description of the project, a parent permission form, and hiring forms. They required completed parent permission forms before any youth could participate. Seven 16-year-olds and eleven 17-year-olds participated in the FFY 2013 (2012) Synar Inspection Study. One pair of youth worked with two drivers, resulting in 10 teams. Each of the 10 teams included both a male and female youth inspector. All youth inspectors resided within the area they inspected, thereby reducing travel time and eliminating the need for overnight stays. To ensure consistency in buying procedure, all youth followed a written script and role-played with the adult supervisors until they mastered the buying procedure. Adult supervisors also trained youth inspectors to look for certain elements while in the store (e.g., the location of

tobacco products, the approximate age of the clerk, gender of the clerk, and the presence of youth access messages).

- Question 6: Legal or procedural requirements instituted by the state to address the issue of youth inspectors' immunity during inspections:
    - 6a. WYSAC instituted no legal requirements.
    - 6b. Yes. Youth inspectors are not permitted to have identification on them during the inspection, helping to maintain confidentiality. They are instructed to refrain from buy attempts if they know anyone at the location. Also, no purchase is ever consummated as the youth inspectors are not permitted to take more than $1.00 with them on inspections.
- Question 7: Legal or procedural requirements instituted by the state to address the issue of the safety of youth inspectors during all aspects of the Synar inspection process:
    - 7a. WYSAC instituted no legal requirements.
    - 7b. Yes. All minors participating in the program must have parental approval and a signed consent form. These youth inspectors are supervised by University of Wyoming contracted adult supervisors. Law enforcement officers were available (by being at the inspection site or available by phone) in case they were needed.
- Question 8: Legal or procedural requirements instituted by the state regarding how inspections are to be conducted:
    - 8a. WYSAC instituted no legal requirements.
    - 8b. Minors are required to be 16 or 17 years of age and are required to be trained by an adult supervisor prior to participating in the inspections. Youth are not allowed to stay overnight away from home while traveling for inspections. Youth also request smokeless tobacco on every third inspection. As part of the smokeless tobacco inspections, youth were instructed to ask for a specific flavor and cut (if asked about cut).

SSES Tables 1-4

SSES Table 1 (Synar Survey Estimates and Sample Sizes)

CSAP-SYNAR REPORT

State	WY
Federal Fiscal Year (FFY)	2014
Date	10/3/2013 13:25
Data	SSES data.xlsx
Analysis Option	Stratified SRS with FPC

Estimates

Unweighted Retailer Violation Rate	8.7%
Weighted Retailer Violation Rate	7.6%
Standard Error	0.5%
Is SAMHSA Precision Requirement met?	YES
Right-sided 95% Confidence Interval	[0.0%, 8.5%]
Two-sided 95% Confidence Interval	[6.6%, 8.7%]
Design Effect	0.6
Accuracy Rate (unweighted)	93.2%
Accuracy Rate (weighted)	93.2%
Completion Rate (unweighted)	96.6%

Sample Size for Current Year

Effective Sample Size	185
Target (Minimum) Sample Size	185
Original Sample Size	409
Eligible Sample Size	381
Final Sample Size	368
Overall Sampling Rate	76.2%

SSES Table 2 (Synar Survey Results by Stratum and by OTC/VM) STATE: WY

FFY: 2014

Samp. Stratum	Var. Stratum	Outlet Frame Size	Estimated Outlet Population Size	Number of PSU Clusters Created	Number of PSU Clusters in Sample	Outlet Sample Size	Number of Eligible Outlets in Sample	Number of Sample Outlets Inspected	Number of Sample Outlets in Violation	Retailer Violation Rate (%)	Standard Error (%)
All Outlets											
1	1	373	349	N/A	N/A	262	245	236	9	3.8%	
2	2	147	136	N/A	N/A	147	136	132	23	17.4%	
Total		520	485			409	381	368	32	7.6%	0.5%
Over the Counter Outlets											
1	1	373	349	N/A	N/A	262	245	236	9	3.8%	
2	2	147	136	N/A	N/A	147	136	132	23	17.4%	
Total		520	485			409	381	368	32	7.6%	0.5%
Vending Machines											
1	1	0	0	N/A	N/A	0	0	0	0	0.0%	
2	2	0	0	N/A	N/A	0	0	0	0	0.0%	
Total		0	0			0	0	0	0	0.0%	0.0%

SSES Table 3 (Synar Survey Sample Tally Summary)

STATE: WY
FFY:
2014

Disposition Code	Description	Count	Subtotal
EC	Eligible and inspection complete outlet	368	
Total (Eligible Completes)			368
N1	In operation but closed at time of visit	4	
N2	Unsafe to access	0	
N3	Presence of police	0	
N4	Youth inspector knows salesperson	1	
N5	Moved to new location but not inspected	0	
N6	Drive thru only/youth inspector has no drivers license	0	
N7	Tobacco out of stock	0	
N8	Run out of time	0	
N9	Other noncompletion (see below)	8	
Total (Eligible Noncompletes)			13
I1	Out of Business	6	
I2	Does not sell tobacco products	6	
I3	Inaccessible by youth	7	
I4	Private club or private residence	0	
I5	Temporary closure	2	
I6	Can't be located	5	
I7	Wholesale only/Carton sale only	0	
I8	Vending machine broken	0	
I9	Duplicate	1	
I10	Other ineligibility (see below)	1	
Total (Ineligibles)			28
Grand Total			409

Give reasons and counts for other noncompletion:

Reason	Count
N9: "No employees available to ask"	2
N9: "No Sheriff's office support"	2
N9: "Only sold in liquor store"	1
N9: "lane closed"	1
N9: missing data on violation outcome	2

Give reasons and counts for other ineligibility:

Reason	Count
I10: "need membership to shop"	1

SSES Table 4 (Synar Survey Inspection Results by Youth Inspector Characteristics)

STATE: WY
FFY: 2014

Frequency Distribution

Gender	Age	Number of Inspectors	Attempted Buys	Successful Buys
Male	14	0	0	0
	15	0	0	0
	16	5	100	4
	17	4	84	6
	18	0	0	0
	Subtotal	9	184	10
Female	14	0	0	0
	15	0	0	0
	16	2	48	4
	17	7	136	18
	18	0	0	0
	Subtotal	9	184	22
Other		0	0	0
Grand Total		18	368	32

Buy Rate in Percent by Age and Gender

Age	Male	Female	Total
14	0.0%	0.0%	0.0%
15	0.0%	0.0%	0.0%
16	4.0%	8.3%	5.4%
17	7.1%	13.2%	10.9%
18	0.0%	0.0%	0.0%
Other			0.0%
Total	5.4%	12.0%	8.7%

Appendix D: Questions 1–12

- Question 1. WYSAC conducted the coverage study in calendar year 2013.
- Question 2:
  - Question 2a. 87.9%
  - Question 2b. 83.4%
  - Question 2c. 124
  - Question 2d. 109
- Question 3a. WYSAC used census tracts, defined by the U.S. Census Bureau, to define coverage areas.
- Question 3b. Yes, WYSAC excluded one census tract (the F.E. Warren Air Force Base) because it is federal land and completely inaccessible to the general public. Other census tracts (such as those that overlapped with the Wind River Indian Reservation and federal parks) contained some areas that are accessible to the public and subject to Wyoming state law. Therefore, WYSAC included all other census tracts in our sampling.
- Question 4a. WYSAC used a *stratified sample* with a *simple random sample.*
- Question 4b. WYSAC used census tracts (defined by the U.S. Census Bureau) to define the geographical areas for the coverage study. To reduce costs and improve efficiency, WYSAC used a stratified sampling design by dividing the census tracts into two strata. WYSAC defined urban census tracts as those with a population density of at least 100 people per square mile and rural census tracts as those with a population density lower than 100 people per square mile. WYSAC used the instructions and formulas presented in SAMHSA's *CSAP Guide for a Synar Sampling Frame Coverage Study* (2006, p. 13-14) to allocate the sample to two strata and optimize costs:

$$n_{urban} = n\frac{N_{urban} * S_{urban}}{N_{urban} * S_{urban} + \frac{N_{rural}S_{rural}}{\sqrt{a^{-1}}}}$$

and

$$n_{rural} = n - n_{urban}$$

where

$$a^{-1} = \frac{cost_{rural}}{cost_{urban}}$$

In this equation, n is the target sample size, n_{urban} is the sample size for the urban strata, N_{urban} is the estimated population size for the urban stratum, S_{urban} is the standard deviation in the urban stratum, N_{rural} is the estimated population size for the rural stratum, S_{rural} is the standard deviation in the rural stratum, and a^{-1} is the cost ratio of canvassing a rural tract over the cost of canvassing an urban tract. Consistent with SAMHSA's guidance on total sample size (2006, p. 11), WYSAC set the target sample size at 120 outlets. Substituting the estimated values for the 2013 coverage study, WYSAC found

found

$$n_{urban} = 120\frac{375 * 0.295}{375 * 0.295 + \frac{145*0.326}{\sqrt{\frac{3}{1}}}} = 96.3$$

and

$$n_{rural} = 120 - 96.3 = 23.7$$

Using the 2013 Synar tobacco retailer list frame, WYSAC determined that Wyoming has an average of 4 tobacco retail outlets per census tract (520 outlets / 130 tracts). Extrapolating the above target sample sizes to target sample sizes in census tracts and rounding to whole numbers, WYSAC found

$$\frac{96.3\ urban\ outlets}{4\ outlets\ per\ tract} \cong 25\ urban\ tracts;\ \frac{23.7\ rural\ outlets}{4\ outlets\ per\ tract} \cong 6\ rural\ tracts$$

and drew a stratified random sample accordingly.

- Question 4c. WYSAC defined *urban* census tracts as having a population density greater than or equal to 100 people per square mile and *rural* census tracts as having a population density greater than 100 square miles or more.
- Question 4d. Skip this question because WYSAC did not use clusters.
- Question 5. Yes, borders of the selected areas were clearly identified at the time of canvassing.
- Question 6. Yes, all sampled areas were visited by canvassing teams.
- Question 7. Yes, field observers were provided with a detailed map of the canvassing areas.
- Question 8. Yes, field observers were instructed to find all outlets in the assigned area. Once WYSAC drew the sample, WYSAC hired several qualified drivers to conduct the coverage study. WYSAC trained them on how physically to canvass each census tract, noting *all* stores that sold tobacco *and* were accessible to minors. WYSAC trained them to conduct a grid search (canvassing north and south streets, then canvassing east and west streets) to ensure they found all tobacco retail outlets. WYSAC sent two drivers on each coverage study trip so that one could navigate and look for stores while the other drove. WYSAC instructed drivers *not* to canvass unpaved roads and any area that was not accessible to the public (e.g., state or national parks where one must pay an entrance fee). Per SAMHSA protocol, drivers did not use any lists to identify outlets.
- Question 9. Skip this question because WYSAC conducted a full canvassing.
- Question 10. If the outlet was open, field observers entered the outlet and looked for tobacco products. They also identified whether the outlet was accessible to minors. If they were unsure if the outlet sold tobacco and/or was accessible to minors, they asked a salesperson. Nine potential outlets were closed when the drivers located them and could not be evaluated for eligibility. WYSAC called these outlets to determine their eligibility and, when appropriate, included them in the sample.
- Question 11. To determine the coverage rate, WYSAC carefully compared the list of outlets discovered during the coverage study to the outlets on the tobacco retailer list frame using business name, address, and city. If the outlet found during the coverage study was on the tobacco retailer list frame with matching or similar addresses, the outlet was considered

covered by the tobacco retailer list frame. WYSAC then determined if the address on the tobacco retailer list frame was 100% accurate.

- Question 12. The coverage equation with weighting is:

$$C = 100 \times \frac{\sum_{i=1}^{k} w_i b_i}{\sum_{i=1}^{k} w_i n_i}$$

In this equation, b_i is the number of outlets from the tobacco retailer list frame found in each stratum, n_i is the number of outlets found by the coverage study in each stratum, and w_i is the stratum weight, calculated by the following equation:

$$w_i = \frac{K_i}{k_i}$$

In this equation, k_i is the number of areas selected for coverage in a stratum and K_i is the number of areas in the stratum. For the 2013 coverage study, the equation expands as follows:

$$C = 100 \times \frac{w_{urban} b_{urban} + w_{rural} b_{rural}}{w_{urban} n_{urban} + w_{rural} n_{rural}}$$

or

$$C = 100 \times \frac{\frac{K_{urban}}{k_{urban}} \times b_{urban} + \frac{K_{rural}}{k_{rural}} \times b_{rural}}{\frac{K_{urban}}{k_{urban}} \times n_{urban} + \frac{K_{rural}}{k_{rural}} \times n_{rural}}$$

WYSAC calculated the 2013 Synar weighted coverage rate:

$$C = 100 \times \frac{\frac{79}{25} \times 88 + \frac{52}{6} \times 21}{\frac{79}{25} \times 95 + \frac{52}{6} \times 29} = 83.4\%$$

This computation gave a final weighted coverage rate of 83.4%, with a 95% Wald confidence interval of 79.7% to 86.0%, above the SAMHSA required threshold of 80% (SAMHSA, 2006).

Appendix F. Synar Inspection Form 2013 (FFY 2014)

The Synar Inspection Form for 2013 (FFY 2014) is on the following two pages.

Synar Inspection Form

Please complete this form as accurately as possible and write legibly.
Use pen or pencil to fill in circles completely, as shown.

Mark Answers Like This ⇨ ● ■
NOT Like This ⇨ ✕ ☑

Inspection Date: (MM/DD/YY) __/__/__ Time of Visit: ○ AM ○ PM

Youth Inspector

Gender: ○ Male ○ Female

Name:

Age: __

Adult Supervisor

Name:

Outlet Information

ID: ___ Hand ID: ___
(for office use only)

Name:_____ Address:_____

City:_____ State:_____ Zip Code:_____

Updated Outlet Information/ Corrections (if needed)

Name:_____ Address:_____

City:_____ State:_____ Zip Code:_____

Eligibility/ Completion

Was the outlet (store) eligible for an inspection?

○ Yes ○ No

↓

If NO, mark one of the following reasons the store was ineligble for inspection:

- ○ Out of business
- ○ Does not sell tobacco products
- ○ Inaccessible to youth
- ○ Private club / personal residence
- ○ Temporary closure
- ○ Could not locate
- ○ Wholesale only / carton sale only
- ○ Vending machine
- ○ Duplicate
- ○ Other (specify):_____

If outlet was eligible, was inspection completed?

○ Yes ○ No

↓

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

- ○ In operation, but closed at time of visit
- ○ Unsafe to access
- ○ Presence of police
- ○ Both youth inspectors know someone in the store
- ○ Drive through only
- ○ Tobacco out of stock
- ○ Ran out of time
- ○ Other (specify):_____

Continued on back

Synar Inspection Form

General Store and Clerk Information

Type of Store:

- ○ Convenience (no gas)
- ○ Convenience (with gas)
- ○ Pharmacy / Drug store
- ○ Grocery store
- ○ Discount / Superstore (e.g., Wal-Mart, Target)
- ○ Tobacco store
- ○ Restaurant / Cafe
- ○ Other (specify):_____

Location of Cigarettes:

- ○ Accessible (customers can pick up a pack of cigarettes without the assistance of an employee)
- ○ Not Accessible (customers require assistance from an employee to obtain cigarettes)
- ○ Youth Inspector Could Not Locate

Location of Chewing Tobacco:

- ○ Accessible (customers can pick up a can of chew without the assistance of an employee)
- ○ Not Accessible (customers require assistance from an employee to obtain chew)
- ○ Youth Inspector Could Not Locate

Were there any youth access signs present in the store? (e.g., "No Sales to Minors")

○ Yes ○ No

Clerk Gender:

○ Male ○ Female ○ Don't know / Not sure

Approximate Age of Clerk: __ __

If inspection was completed, was buy attempt successful?

○ Yes (Violation) ○ No (Nonviolation) ○ Not Completed

↓

If YES, how much was the pack/can? $ ___.___ ___

What type of tobacco did the youth inspector ask for? (Every third inspection should be for chewing tobacco.)

○ Cigarettes ○ Chewing Tobacco

What tobacco brand was attempted to be purchased?

- ○ Marlboro
- ○ Marlboro Golds
- ○ Camel
- ○ Camel Blues
- ○ Skoal Wintergreen
- ○ Copenhagen Wintergreen
- ○ Other brand (please specify): _____

Did the clerk ask for youth's ID? ○ Yes ○ No

Did the clerk ask for youth's age? ○ Yes ○ No

Notes:

Youth Inspector Initial: _____ **Adult Inspector Signature:** _____

Return the completed form to: Wyoming Survey & Analysis Center, Dept. 3925
1000 E. University Ave., Laramie, WY 82071