Wyoming's 2011 Synar Tobacco Compliance Report

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Short reference: WYSAC (2011), *Wyoming's 2011 Synar report*.

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Wyoming's 2011 Synar Tobacco Compliance Report

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, Behavioral Health Division (WDH-BHD) has contracted with the Wyoming Survey & Analysis Center (WYSAC) at the University of Wyoming to conduct the Synar compliance inspections. Each summer, WYSAC recruits minor buyers (15-, 16-, and 17-year-olds) to conduct these inspections, under adult supervision, on a stratified random sample of tobacco retail outlets in Wyoming.

The overall weighted retailer violation rate (RVR) in 2011 was 8.7%, well below the federally stipulated maximum of 20.0%. Crosstab analyses (Pearson's chi-squared and Fisher's exact tests, one-tailed, depending on cell counts) revealed the following additional results:

- Asking for identification was almost perfectly associated with attempts to sell.
    - *Every* clerk who did not ask for identification attempted to sell the tobacco product.
    - Only *one* clerk who asked for identification attempted to sell the tobacco product.
- Violations were more likely with smokeless tobacco than with cigarettes.
- Violations were more likely with minor buyers who looked 18 or older, compared to minor buyers who looked younger than 18.
- Violations were more likely with minor buyers who were young women than young men.
- Violations were more likely with younger rather than older clerks.

In 2009 and 2010, WYSAC created a logistic regression model to determine which factors were most influential in predicting whether clerks would attempt to sell tobacco products to minors. Historically (WYSAC, 2007, 2008, 2009, 2010), the primary predictor of attempts to sell has been clerks not asking minor buyers for identification. In 2011, this relationship was so strong it required WYSAC to develop a model to determine which factors were most influential in predicting whether clerks asked for identification (as opposed to predicting attempts to sell). Controlling for other variables in the model, key findings from our analysis include the following:

- As compared to cigarette inspections, clerks were less likely to ask minor buyers for ID during smokeless tobacco inspections.
- Clerks were less likely to ask minor buyers for ID if they looked 18 or older, as compared to younger looking minor buyers. None of our minor buyers looked older than 26.[1]
- Younger clerks (based on the minor buyers' estimates) were less likely to ask for ID than were older clerks.

[1] The Food and Drug Administration (FDA) requires age verification with photographic identification for people 26 years of age and younger when purchasing tobacco products (FDA, 2010b).

2. Introduction

2.1. Background

In 1992, 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% (SAMHSA, 2010). Since 2003, the Wyoming Department of Health, Behavioral Health Division[2] (WDH-BHD) has contracted with the Wyoming Survey & Analysis Center (WYSAC) at the University of Wyoming to conduct Wyoming's annual Synar compliance inspections.

The Family Smoking Prevention and Tobacco Control Act (Tobacco Control Act; Public Law 111-31) was signed into law on June 22, 2009, giving the Food and Drug Administration (FDA) authority over the marketing, sale, and distribution of tobacco products. One of the new regulations in this act is the Regulations Restricting the Sale and Distribution of Cigarettes and Smokeless Tobacco to Protect Children and Adolescents. This regulation was 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, with photo identification of anyone 26 years of age or younger, that purchasers of tobacco products are 18 years of age or older. The regulation also prohibits self-service displays and vending machines in areas accessible to youth (FDA, 2010b) and prohibits the use of terms such as light, mild, and low tar in marketing or branding cigarettes (FDA, 2010a).

2.2. Organization of This Report

This document contains seven sections. Sections 1 and 2 provide an executive summary and an introduction, respectively. Section 3 describes WYSAC's methods for conducting the 2011 Synar inspections and for analyzing the data. Section 4 contains key findings of the study. Section 5 provides conclusions and Section 6 contains a list of references cited in the report. Section 7 contains five appendices. Appendix A presents the script used to train minor buyers. Appendix B displays the results for each question on the 2011 Synar Inspection Form. Appendix C includes detailed calculations for the inspection sampling design, the retailer violation rate, and the logistic regression model. Appendix D contains inspection information for CSAP's FY 2012 Annual Synar Report. Appendix E is the data collection form used for the 2011 Synar inspections.

3. Methods

3.1. Sampling Design

To ensure we had a comprehensive list of tobacco retail outlets in Wyoming, WYSAC developed the 2011 tobacco retailer list frame from three sources:

1. The list frame updated after the 2010 Synar inspections and coverage study, including removal of ineligible outlets (WYSAC, 2010),
2. Updates from county program managers to the list described above , and

[2] Formerly known as the Wyoming Department of Health, Mental Health and Substance Abuse Services Division.

3. Lists of licensed tobacco retailers from the three Wyoming municipalities that require local licensing of tobacco retailers (Cheyenne, Ten Sleep, and La Barge).

By compiling this information, WYSAC created a list with 558 outlets.

As in previous years, we categorized each tobacco retail outlet into one of two strata based on its location in either an *urban* town (population 3,000 or more) or a *rural* town (population fewer than 3,000). The list frame had 407 outlets in the urban stratum and 151 outlets in the rural stratum. We used the Synar Survey Estimation System (SSES), Version 4.0[3] to determine the sample size for each stratum. (See Appendix C.1 for more information about the sampling calculations and procedure.) With 10% safety margins for noncompletion, SSES yielded a planned sample size of 142 for the urban stratum and a planned sample size of 143 for the rural stratum, resulting in a total planned sample of 285 outlets. WYSAC drew a random sample for each stratum using PASW Statistics Version 18.0.2.

3.2. Protocol

The 2011 Synar inspections began on June 26, 2011, and they ended on September 13, 2011. Twelve teams completed the inspections. The teams consisted of one adult supervisor/driver, two minor buyers (one young man and one young woman), and one law enforcement officer. A few regions were inspected by multiple teams because of logistic issues (e.g., two drivers became sick during investigations in the two regions comprised of Teton/Lincoln/Sublette and Laramie/Goshen/ Platte/Niobrara Counties).

As required by the Wyoming Attorney General, a local law enforcement officer was available for every inspection. Law enforcement officers did not accompany the minor buyers into the store. The primary role of the law enforcement officers was to observe the inspection; 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 Laramie, Wyoming, to be the adult supervisors. Prior to hiring the adult supervisors, WYSAC conducted criminal background checks and reviewed the driving records of applicants. We trained all adult supervisors in Synar protocol. The adult supervisors were then responsible for training the minor buyers.

WYSAC recruited most minor buyers by asking previous buyers to participate again (if they were still in the eligible age range) or to provide referrals (if they had turned 18 or were no longer interested in participating). Program managers in the Tobacco-Free Wyoming Communities Program also provided contacts for minor buyers. We first contacted potential minor buyers via telephone to describe the project and speak with one of their parents or guardians. Once the minor buyer and the parent/guardian expressed interest, we sent them a written description of the project, a parent/guardian permission form, and hiring forms. We required completed parent permission forms before any minor buyers could participate. Two 15-year-olds, eight 16-year-olds, and six 17-year-olds participated in the 2011 Synar inspection study. Additionally, one young man turned 16 during his inspection work; he completed some inspections as a 15-year-old and others as a 16-year-

[3] SAMHSA distributed Synar Survey Estimation System Version 5.0 after we had drawn our sample and began inspections; reported changes were to the analysis of collected data, not drawing the sample.

old. WYSAC recorded his age at the time of each inspection, as suggested for SSES analyses (SAMHSA, 2011).

All minor buyers resided within the area they inspected, thereby reducing travel time and eliminating the need for overnight stays by the minor buyers. To ensure consistency in buying procedure, all minor buyers followed a written script (see Appendix A) and role-played with the adult supervisors until they mastered the buying procedure. Adult supervisors also trained minor buyers to observe and describe certain aspects of the stores and clerks (i.e., the location of tobacco products, the presence of anti-tobacco messages, the approximate age of the clerk, and the gender of the clerk).

Upon arriving at an outlet, one minor buyer (alternating between young men and young women) entered the outlet and, following the buyer script, attempted to purchase tobacco. During most inspections, minor buyers attempted to purchase Marlboro Golds cigarettes. When unavailable, young women attempted to purchase Camel Blues, and young men attempted to purchase Camels.[4] During every fifth inspection, the minor buyers (regardless of gender) asked for Skoal Wintergreen long cut or Copenhagen Wintergreen long cut (when Skoal Wintergreen was unavailable). This protocol is different from the protocols used previously. In 2010 (the first year to include smokeless tobacco inspections), minor buyers 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 (UMDNJ-School of Public Health, 2006) to choose the flavor and cut for the script.

When minor buyers knew anyone in the store, they left the store without attempting a purchase and returned to the car. If the second minor buyer did not know anyone in the store, he or she attempted the buy. If both minor buyers knew someone in the store, the team returned later to attempt the buy.

Survey protocol required minor buyers to leave their identification in the car with the adult supervisors or to leave it at home. This strategy allowed minor buyers to answer honestly, "I don't have it on me," if a clerk asked for identification. Similarly, if asked their age, minor buyers were trained to answer honestly. The minor buyers each carried approximately $1.00 in cash, so if a sale was attempted they could not produce enough money to pay for the tobacco. In accordance with protocol, no purchase attempts were consummated. The inspection was completed either by a clerk's refusal to sell or by an attempt to sell.

Immediately following each inspection, minor buyers returned to the vehicle and reported the details of the attempted purchase to the adult supervisors, who then entered this information on a data form. (See Appendix E for a copy of this form.) WYSAC collected the forms at the end of each inspection trip. The information reported on the form includes the following:

- Minor buyer name, age, and gender;
- Store name and address (with corrections to the list frame as needed);
- Inspection date and time of day (morning or afternoon);
- Completion status of the inspection (e.g., ineligible outlet, eligible outlet that was not inspected, completed inspection);
- Clerk gender and estimated age;

[4] Prior to June 2010, Marlboro Golds were marketed as Marlboro Lights; Camel Blues were marketed as Camel Lights.

- Type and brand of tobacco product requested;
- Location of tobacco products in the store (i.e., accessible or not for cigarettes or smokeless tobacco);
- Outcome of the buy attempt (e.g., violation, nonviolation, noncompletion); and
- The presence of any visible anti-tobacco messages (e.g., "No Sales to Minors").

Adult supervisors photographed each minor buyer on their first day of inspections. When the inspections were complete, WYSAC asked 13 raters unfamiliar with the Synar project to estimate the age of each minor buyer. We then calculated the mean for the 13 ratings to determine a perceived age for each buyer. We used these mean ratings to assess whether the minor buyers looked their age, as SAMHSA recommends (SAMHSA, 2010). It also allowed us to statistically test whether the minor buyers who *looked* 18 or older made more successful purchase attempts (i.e., more violations). The lowest perceived age was 15.6 and the highest perceived age was 19.4. Of the 17 minor buyers, seven had perceived ages of 18 or older and 10 had perceived ages younger than 18. Because every minor buyer looked (and was) younger than 26, FDA regulations (FDA, 2010b) indicate that every minor buyer should have been asked for ID on every inspection.

3.3. Inspected Outlets

Of the 285 outlets in the sample, 37 were ineligible. These outlets were ineligible for the following reasons: out of business (15), did not sell tobacco products (12), inaccessible to youth (4), temporary closure (5), and could not be located (1). Thus, the total number of *eligible* stores was 248. Another seven outlets were eligible, but *not inspected*. These outlets were not inspected for the following reasons: both minor buyers knew salesperson (3), tobacco out of stock (1), unsafe to access (1), and other (2). The two "other" reasons were that a store was open but unattended and that a driver skipped an outlet for an unreported reason. WYSAC *inspected* 241 outlets, or 97.2% of the eligible outlets in the sample. Of these, 118 outlets were in the urban stratum and 123 outlets were in the rural stratum. WYSAC excluded two of the eligible, inspected, urban outlets from analyses because of missing violation data, bringing the number of *analyzed* outlets to 239 (96.4% of the eligible outlets).[5]

3.4. Analysis

To calculate the weighted RVR and most of the descriptive statistics reported in Section 3.3, we used SSES Version 5.0, an add-in for Microsoft Excel 2010. SAMHSA distributes and recommends use of this software to facilitate reporting of analyses by each state. To facilitate identification of SSES output tables, we have copied the relevant output tables from SSES directly into this document, preserving the formatting as generated by SSES (e.g., purple shading).

We conducted various crosstab analyses to identify variables associated with violations. Depending on the specific analysis, we used Pearson's chi-squared test or Fisher's exact test to identify statistically significant relationships. Fisher's exact test is an alternative to Pearson's chi-squared test that provides more reliable results in analyses where cells in the crosstabs have few observations (as a rule of thumb, a cell with zero observations or 25% of cells with fewer than five observations). In Section 4, Key Findings, we report which test we used for each reported relationship. We report significant differences when $p < 0.05$, suggesting that we can say with 95% confidence that our

[5] SSES analyses treated these as eligible, noncomplete inspections.

results are not due to chance. In general, we report weighted data (consistent with SSES). However, we occasionally report unweighted counts for clarity.

In previous years, WYSAC (2009, 2010) created a logistic regression model to determine which factors were most influential in predicting whether a clerk would attempt to sell tobacco products to minors. In those years, whether clerks asked minor buyers for identification was the primary predictor in models of attempts to sell. In 2011, the relationship between clerks asking for identification and an attempted sale was so strong it interfered with generating a valid model.[6] Instead, WYSAC developed a model to determine which factors were most influential in predicting whether clerks ask for identification.

To develop this model, we ran a logistic regression using PASW Statistics Version 18.0.2. (See Appendix C.3 for more information on the logistic regression model.) Using clerks asking for ID as the dependent variable, we initially examined each independent variable (i.e., type of tobacco, tobacco brand, sampling stratum, morning/afternoon visit, adult driver/supervisor, unique minor buyer identifier, minor buyer gender, minor buyer perceived age, store type, accessibility of tobacco, presence or absence of anti-tobacco signs, clerk gender, estimated clerk age, and whether the clerk asked the minor buyer's age) by itself to determine its effect on asking for ID. Several variables were significant (at the $\alpha = .05$ level) in these crosstabs analyses:[7]

- Type of tobacco,
- Minor buyer perceived age,
- Minor buyer gender,
- Estimated clerk age (in categories as displayed in Appendix B),
- Adult supervisor, and
- Store type.

We then tested different models using different combinations of these variables and predictor variables that were not statistically significant in crosstab analyses (e.g., sampling stratum). We created a final model with six independent variables: type of tobacco, perceived age of minor buyer, minor buyer gender, clerk's estimated age, adult supervisor, and sampling stratum. This final model was parsimonious and fit the data. Based on tests for multicollinearity of predictors; no relationships between predictor variables interfered with the model. (See Appendix C.3 for complete details about our modeling process.) One limitation of our logistic regression model is that we had low cell counts on several variables, especially clerks asking for ID (only 20 out of 239 clerks did not ask for ID) and clerks asking for age (only four clerks asked for the minors' ages). Similarly, minor buyers conducted approximately four times as many cigarette inspections as smokeless tobacco inspections. Low cell counts can increase variability in the model thereby increasing confidence intervals.

4. Key Findings

4.1. Retailer Violation Rate (RVR) as Calculated by SSES

The noncompliance rate or retailer violation rate (RVR) is the percentage of stores that attempted to sell to a minor. We weighted the overall RVR to account for our stratified sampling design (see Appendix C.2 for the RVR formula). In 2011, the overall weighted RVR was 8.7%. This percentage is not statistically significantly different from any RVR in Wyoming since 2000 (Table 1).

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[6] *Every* clerk who did not ask for ID attempted to sell; only *one* clerk who asked for ID attempted to sell.

[7] Pearson's chi-squared tests or Fisher's exact tests, depending on cell counts.

Table 1. Retailer Violation Rates, 1996–2011

Synar survey year	Retailer violation rate (RVR; in %)	95% confidence interval of RVR (in %)
1996	42.0	NA
1997	28.5	NA
1998	45.6	NA
1999	55.8	NA
2000	8.9	6.5–11.3
2001	9.5	7.0–11.8
2002	8.2	5.2–11.2
2003	8.0	2.2–13.8
2004	8.7	5.5–11.9
2005	7.0	6.5–11.3
2006	6.5	4.3–8.7
2007	7.7	5.7–9.7
2008	9.0	6.6–11.4
2009	9.6	6.9–12.3
2010	7.3	5.2–9.3
2011	8.7	5.7–11.8

SSES provided a summary table of Synar survey estimates and sample sizes (Table 2). The standard error was ±1.6%, which meets the SAMHSA precision requirement of ±3.0%. Because we drew a sample of outlets and did not inspect *all* outlets in Wyoming, SSES calculated a 95% confidence interval. Therefore, as shown in Table 2, we can be 95% confident that the "true" value of the RVR is between 5.7% and 11.8%. Even when accounting for sampling error, the likely maximum RVR (11.8%) is still well below the 20% noncompliance standard set by SAMHSA.

Table 2. Synar Survey Estimates and Sample Sizes

State	WY
Federal Fiscal Year (FFY)	2012
Date	10/20/2011 13:18
Data	Final SSES file.xlsx
Analysis Option	Stratified SRS with FPC
Estimates	
Unweighted Retailer Violation Rate	8.8%
Weighted Retailer Violation Rate	8.7%
Standard Error	1.6%
Is SAMHSA Precision Requirement met?	YES
Right-sided 95% Confidence Interval	[0.0%, 11.3%]
Two-sided 95% Confidence Interval	[5.7%, 11.8%]
Design Effect	1.2
Accuracy Rate (unweighted)	87.0%
Accuracy Rate (weighted)	86.5%
Completion Rate (unweighted)	96.4%
Sample Size for Current Year	
Effective Sample Size	216
Target (Minimum) Sample Size	216
Original Sample Size	285
Eligible Sample Size	248
Final Sample Size	239
Overall Sampling Rate	49.5%

4.2. Factors Associated with Attempted Sales

Because percentages reported in this section demonstrate RVRs within groups, they do not total 100% within or across figures. WYSAC used PASW Statistics Version 18.0.2. to conduct the analyses and identified variables associated with retailer violations. We weighted the data by strata with a noncompletion adjustment factor, as suggested by SAMHSA and as programmed in SSES. This process accounts for different sampling ratios (i.e., sampling different percentages of the rural and urban outlets) and different completion rates for the two strata.

4.2.1. Significant Relationships With Attempts to Sell

In this section, we report variables associated with clerks' willingness to sell tobacco to minors. A summary of the statistical comparisons follows in Table 3; discussion of each variable follows the table.

Table 3. Tested Associations With Retailer Violation

Variable	χ^2	Degrees of freedom	Weighted number of outlets included in analysis	Statistical significance (*p*)	Higher RVR circumstance
Ask ID	Fisher's exact test, one-tailed*	NA	470	< .001	Not asking for ID
Type of tobacco	14.0	1	475	< .001	Smokeless tobacco
Perceived age of minor buyer, dichotomized	20.83	1	475	< .001	Minors who looked 18 or older
Minor buyer gender	7.90	1	475	.005	Young women
Clerk age	17.63	5	475	.003	Younger clerks (esp. 18-24 years old)
Adult supervisor	17.49	4	475	.002	1 anomalous driver
Store type	15.23	7	475	.033	Complex (8 categories, see text)
Anti-tobacco signs	Fisher's exact test, one-tailed*	NA	466	.058	Stores without signs†
Clerk gender	0.001	1	474	.974	Women†
Accessibility of *any* tobacco product	Fisher's exact test, one-tailed*	NA	454	.549	Inaccessible†
Ask age	Fisher's exact test, one-tailed*	NA	452	.563	Not asking for age†
Time of visit	0.38	1	474	.325	PM†
Rural/Urban stratum	0.23	1	474	.880	Rural outlets†

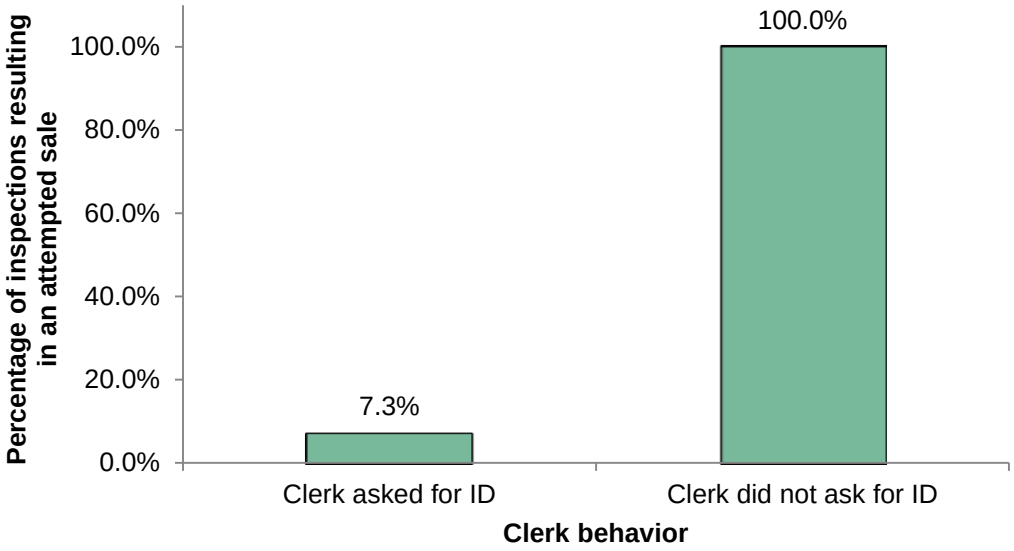
* Conclusions would have been the same with two-tailed tests.
† The higher RVR circumstance for nonsignificant relationships is provided for informational purposes only, not for interpretation.
Note. The number of outlets included in analyses varies because of missing data.

Clerks Asking for ID

Clerks who asked minor buyers for identification were *much* less likely to attempt to sell tobacco to minor buyers (Figure 1). In 2011, there was a nearly perfect relationship between asking for ID and attempts to sell. *Every* clerk who did not ask for ID attempted to sell the tobacco product; only *one* clerk who asked for identification went on to attempt to sell the tobacco product.[8]

[8] These are the unweighted frequencies. Percentages reported throughout the body of the report are based on weighted analyses. Thus, they will not match hand calculations based on unweighted frequencies.

Figure 1. Relationship Between Clerks Asking for ID and Attempts to Sell

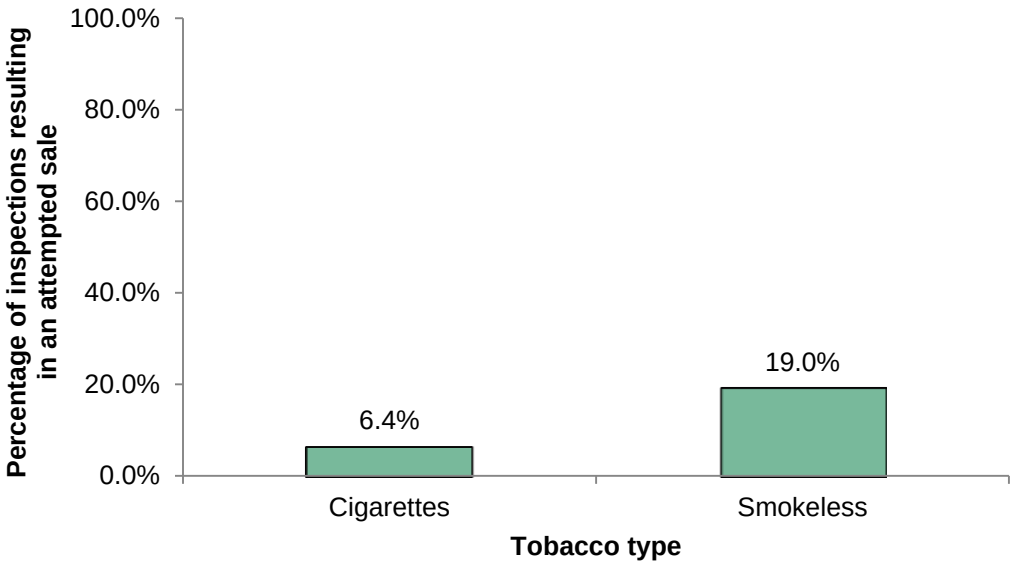


Type of Tobacco

Clerks were more likely to attempt to sell smokeless tobacco than to sell cigarettes to minor buyers (Figure 2). Tobacco brand also had a statistically significant relationship with clerks attempting to sell, but we do not report details because this relationship was confounded with type of tobacco and few inspections required minor buyers to ask for the protocol's secondary tobacco brands (i.e., the vast majority of cigarette inspections were for Marlboro Golds and the vast majority of smokeless tobacco inspections were for Skoal Wintergreen). Despite this difference, we chose not to conduct analyses separately for cigarettes and smokeless tobacco for three main reasons:

- This approach is consistent with SSES reporting a single RVR and other results disregarding the type of tobacco solicited during inspections.
- In 2010 WYSAC did not find a statistically significant difference in RVR for the two tobacco types. Until we can replicate one year's results, it is difficult to determine which result is accurate.
- We conducted too few smokeless tobacco inspections to provide reliable statistical estimates of relationships between smokeless tobacco and predictors of violation.

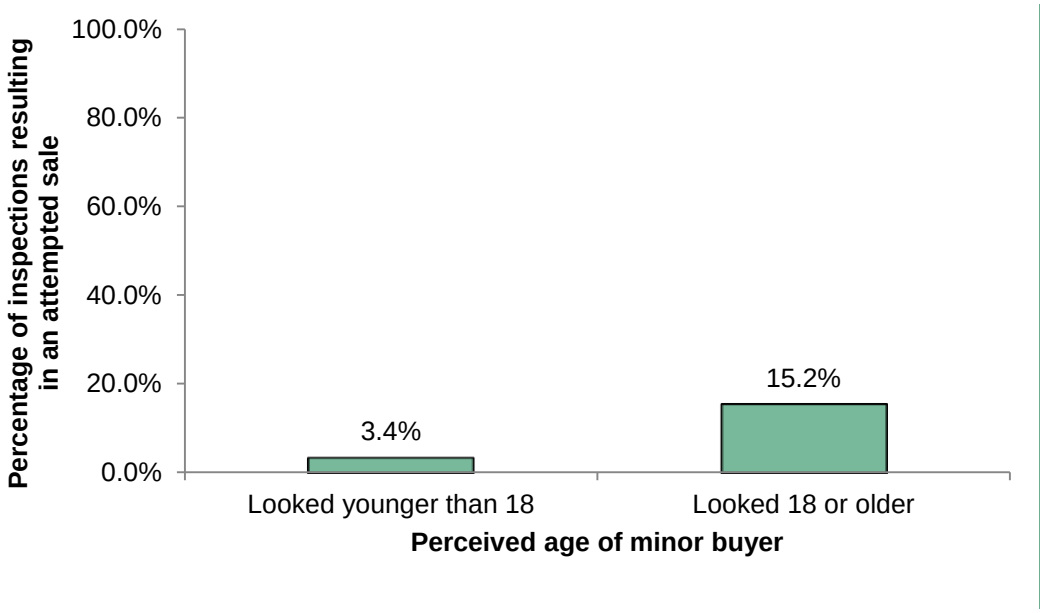
Figure 2. Relationship Between Type of Tobacco and Attempts to Sell



Perceived Age of Minor Buyer

We dichotomized perceived age of minor buyers to indicate minor buyers who looked younger than 18 and those who looked 18 or older. Clerks were more likely to attempt to sell tobacco to our minor buyers who looked 18 or older (Figure 3).

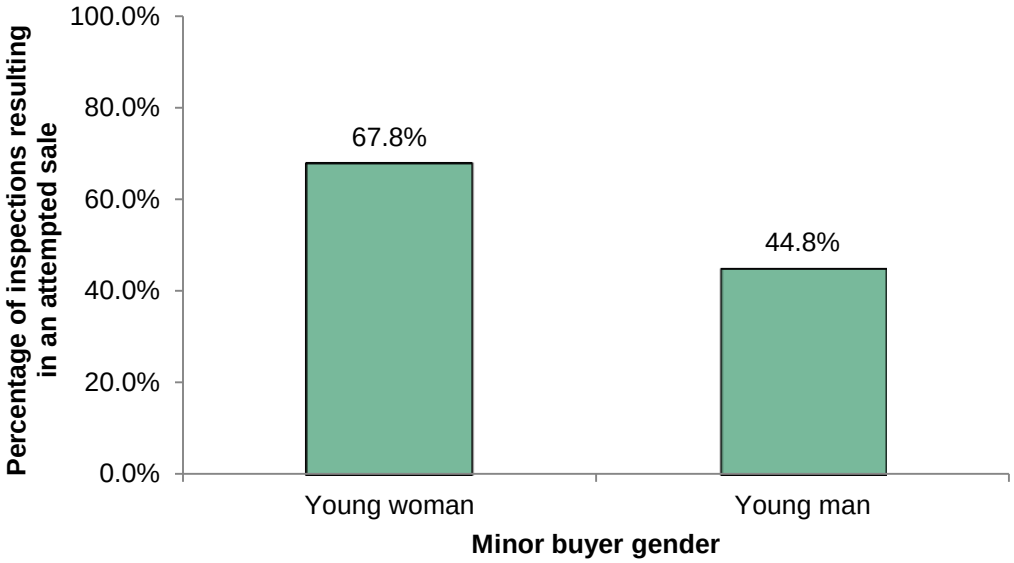
Figure 3. Relationship Between Perceived Buyer Age and Attempts to Sell



Minor Buyer Gender

Clerks were more willing to sell tobacco products to young women than young men (Figure 4).

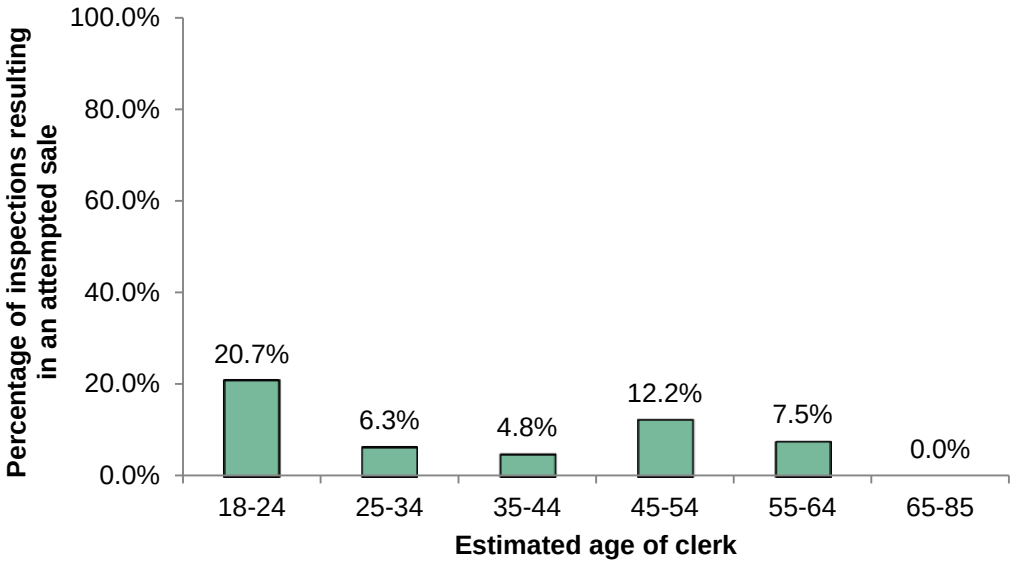
Figure 4. Relationship Between Minor Buyer Gender and Attempts to Sell



Estimated Clerk Age

In general, older clerks were less likely to attempt to sell tobacco products than were younger clerks, though we found substantial variability (Figure 5). Clerks with estimated ages between 18 and 24 years were most likely to attempt to sell.

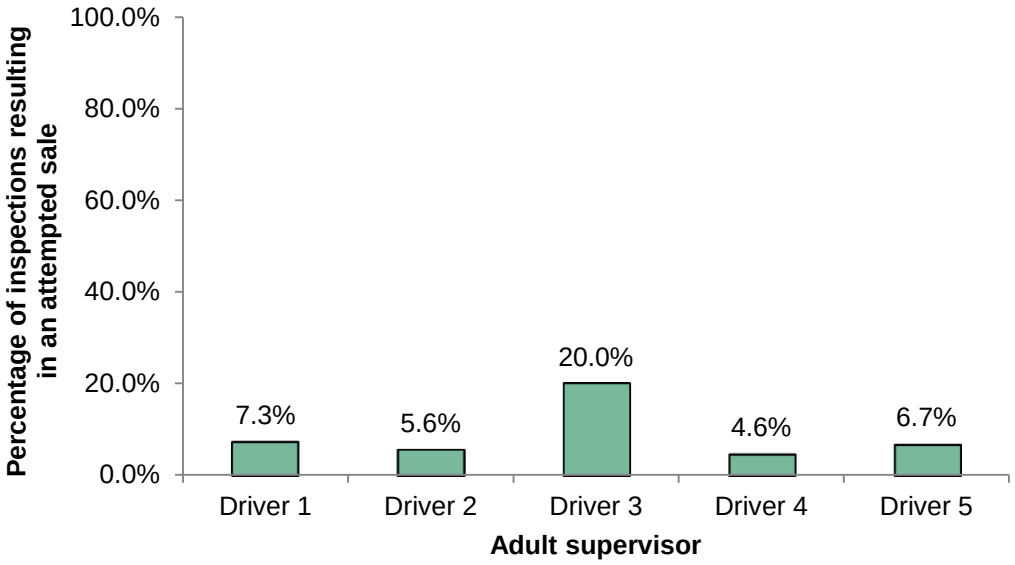
Figure 5. Relationship Between Estimated Clerk Age and Attempts to Sell



Adult Supervisor

In 2011, for the first time since conducting the Synar inspections, we analyzed the data for possible effects of adult supervisors. We found that one supervisor was associated with a significantly higher violation rate than the other supervisors (Figure 5). This relationship is likely confounded by the minor buyers with whom each driver worked (most minor buyers worked with only one driver) and the region in which they worked (most regions were visited by one and only one driver).

Figure 6. Relationship Between Adult Supervisor and Attempts to Sell



Store Type

We found a statistically significant relationship between type of store and buy attempt. However, with the large number of store types (eight categories including "other") and the relatively low RVR, these results should be interpreted with caution. Some types of stores had too few violations to provide reliable population estimates from our sample. We followed-up on this finding with a dichotomized variable with convenience stores (with or without gas) and all other store types (i.e., pharmacy/drug store, grocery store, discount/superstore, tobacco store, restaurant/café, and "other") as the two groups. The relationship between this variable and RVR was not statistically significant, χ^2 (1, N = 474) = .003, p = .954.

Presence of Anti-tobacco Signs

Although the relationship between the presence/absence of anti-tobacco signs (e.g., "No Sales to Minors") did not meet our threshold for statistical significance, stores with anti-tobacco signs showed a trend toward having clerks who were less likely to sell tobacco products to minor buyers. The RVR for stores with anti-tobacco signs was 7.9% compared to 16.0% for stores without anti-tobacco signs, p = .058.

4.2.2. Relationships Between Predictor Variables

Tobacco Accessibility

There was a perfect relationship between cigarette and smokeless tobacco self-service displays, Fisher's exact test, one-tailed, $p < .001$. Every store that had accessible cigarettes also had accessible

smokeless tobacco, and vice versa. However, 4.3% of inspected outlets did not have data reported on this variable. Inspection of the data indicated that minor buyers did not consistently report on the location of non-inspected tobacco products. For example, a minor buyer may not have taken note of the location of cigarettes during an inspection for smokeless tobacco. An additional factor may be that some outlets may have only sold one type of tobacco (e.g., only sold cigarettes).

Minor Buyer Gender and Perceived Age

Among our minor buyers, more young women than young men (58% versus 42%, respectively) had a perceived age rating younger than 18, χ^2 (1, N = 474.7) = 25.6, $p < .001$. Because of this statistically significant relationship, we strongly considered youth gender as a control variable in our logistic regression analyses (see Section 4.2.3 and Appendix C.3).

4.2.3. Predictors of Clerks Asking for Identification

All of the statistical tests described in Section 4.2.1 examined the effects of single predictor variables on the dependent variable (attempt to sell). Considering multiple predictors at the same time can change relationships between predictor variables and the dependent variable. Therefore, statistical methods such as logistic regression that account for various predictors simultaneously provide a more nuanced description of the relationships between predictors and the outcome of an inspection. This section describes the variables we included in our logistic regression model (Tables 4 and 5). As noted in Section 4.2.1., there was a nearly perfect relationship between asking for ID and clerks attempting to sell tobacco products. The strength of this relationship made it impossible for the modeling procedure to generate statistically reliable estimates for that or other relationships. Because of the nearly perfect relationship, however, asking for ID serves as a proxy for attempting to sell. So, in 2011, our logistic regression used asking for ID as the dependent variable. This change in the dependent or outcome variable means that results from this logistic regression are not comparable to the models WYSAC developed in 2009 and 2010.

Although not all variables in our model are statistically significant predictors, accounting for all of these variables at once leads to the most parsimonious description of the factors contributing to whether a clerk asks for ID. We report statistical significance when $p < 0.05$, indicating that we can determine with 95% confidence that our results are not due to chance. Appendix C.3 presents more details about the variables, model building process, and statistics associated with our logistic regression model.

Table 4. Coding of Categorical Variables

Categorical variable	Parameters	Parameter coding
Asked for ID (predicted variable)	Asked for identification/likely did not violate	0
	Did not ask for identification/likely violated	1
Tobacco type	Cigarettes	1
	Smokeless tobacco	0
Minor buyer perceived age	Under 18	1
	18 or older	0
Minor buyer gender	Young man	1
	Young woman	0
Selected driver versus other drivers	Most drivers	1
	Driver with an atypically high RVR	0
Stratum	Urban	1
	Rural	0

Table 5. Summary of Model Predicting Clerks Asking for ID

Variable	Statistical significance *(p)*	Odds ratio	95% Confidence interval for odds ratio	
			Lower bound	Upper bound
Type of tobacco	.022	0.40	0.18	0.88
Perceived age of minor buyer	.017	0.36	0.15	0.83
Minor buyer gender	.129	1.85	0.84	4.07
Clerk's estimated age	.020	0.97	0.94	1.00*
Recoded adult supervisor	.001	0.26	0.12	0.57
Sampling stratum	.204	0.60	0.27	1.32
Constant	.298	2.39		

* Rounded from 0.995.

Type of Tobacco

Controlling for other variables (e.g., minor buyer age, minor buyer gender, and outlet strata), clerks were less likely to ask minor buyers for ID during inspections for smokeless tobacco than during inspections for cigarettes. The odds of a clerk asking for ID during an inspection for smokeless tobacco were 0.40 times those for cigarette inspections.

Perceived Age of Minor Buyer
Controlling for other variables, clerks were less likely to ask for ID during inspections with minors who looked older than 18. The odds of a clerk asking a minor buyer with a perceived age younger than 18 were 0.36 times those for minor buyers with perceived ages of 18 or older.

Clerk's Estimated Age
This was the weakest statistically significant predictor of asking for ID.[9] Controlling for other variables, younger clerks were less likely to ask minor buyers for their ID.

Adult Supervisor
As noted in Section 4.2.1, we identified an adult supervisor who, for unknown reasons, was associated with a higher RVR than the other drivers. We created a variable to distinguish that supervisor from all other adult supervisors and included this variable in our model. Even when controlling for the other variables in the model, the odds of clerks asking minor buyers for ID (strongly associated with violations[10]) were lower for this supervisor than for all other supervisors, as a group. The odds of clerks asking for ID during inspections overseen by this adult supervisor were 0.26 times the odds during inspections overseen by the other supervisors, as a group.

Control Variables (Minor Buyer Gender, Sampling Stratum)
A model (unreported) with only the four predictors described above was not a good fit for the data. However, including two other variables to control for their effects improved the fit of the model and resulted in our final model (reported). Regarding these control variables, we observed two trends: Clerks were less likely to ask young men for their ID, and clerks in rural outlets were less likely to ask minor buyers for their ID. However, when controlling for other variables in the model, neither minor buyer gender nor sampling stratum were statistically significant predictor variables.

5. Conclusions

The 2011 overall weighted retailer violation rate (RVR) in 2011 was 8.7%, well below the federally stipulated maximum of 20.0%, even when accounting for error with a 95% confidence interval. In 2010, the weighted RVR was 7.3%. The confidence intervals (one- and two-sided) for both estimates overlap; therefore, we cannot say the change was a statistically significant increase in RVR. Crosstab analyses (Pearson's chi-squared and Fisher's exact tests, one-tailed, depending on cell counts) revealed the following additional results:

- Asking for identification was almost perfectly associated with attempts to sell.
    - *Every* clerk who did not ask for identification attempted to sell the tobacco product.
    - Only *one* clerk who asked for identification attempted to sell the tobacco product.
    - Since 2007, this variable has been the primary predictor of attempts to sell (WYSAC, 2007, 2008, 2009, 2010).
- Violations were more likely with smokeless tobacco than with cigarettes. This finding differs from 2010, when WYSAC did not find a statistically significant relationship between tobacco type and RVR. This may have resulted from changes to our protocol to improve the plausibility of minor buyers' smokeless tobacco purchase attempts.

[9] The odds ratio was closest to one and the confidence interval of the odds ratio did not overlap with the confidence intervals of the odds ratios of the other statistically significant predictors. Because the confidence intervals for the odds ratios for the other statistically significant predictors overlap, we cannot say that one is a statistically weaker (or stronger) predictor than another.
[10] *Every* clerk who did not ask for ID attempted to sell; only *one* clerk who asked for ID attempted to sell.

- Violations were more likely with minor buyers who looked 18 or older, compared to minor buyers who looked younger than 18.
- Violations were more likely with minor buyers who were young women than young men.
- Violations were more likely with younger rather than older clerks.

In 2009 and 2010, WYSAC created a logistic regression model to determine which factors were most influential in predicting whether clerks would attempt to sell tobacco products to minors. Historically (WYSAC, 2007, 2008, 2009, 2010), the primary predictor of attempts to sell has been clerks not asking minor buyers for identification. In 2011, this relationship was so strong it required WYSAC to develop a model to determine which factors were most influential in predicting whether clerks asked for identification (as opposed to predicting attempts to sell). When controlling for other predictors (e.g., strata size and minor buyer gender), asking for smokeless tobacco (rather than cigarettes), minor buyers looking 18 or older (as opposed to younger than18), and younger clerks were all associated with lower odds of asking for ID (and, relatedly, higher probability of violations). Because the models in 2009 and 2010 treated violations as the outcome variable and asking for ID as a predictor variable, our 2011 model is not comparable to previous models. Future trainings for retailers could incorporate our findings to improve the probability of clerks asking all youth for identification and, in turn, reduce the number of clerks who attempt to sell tobacco to minors.

In the logistic regression model, the nonsignificant trend for minor buyer gender differs from the results of a Pearson's chi-square test showing a higher RVR for young women. This difference suggests that controlling for other variables (e.g., minor buyer perceived age) diminishes the statistical influence of minor buyer gender as a predictor of asking for ID. Results of statistical tests (both crosstabs and logistic regression models) of the relationship between minor buyer gender and violations have not been consistent since 2009 (WYSAC, 2009, 2010). Therefore, the role of this variable as a predictor of violations or asking for ID remains unclear.

For the first time, WYSAC analyzed the possible influence of individual adult supervisors on the results of inspections. Although drivers received the same training (typically in combined sessions), we found statistically significant differences between adult supervisors. Because these effects are likely confounded by other factors (e.g., the minor buyers with whom they worked— minor buyers rarely worked with multiple drivers—and geographical factors associated with the assigned regions—most regions were inspected by one and only one adult), these results are difficult to interpret. In future Synar studies, it may be worth collecting information about the adult supervisors to explore this effect (if it recurs).

6. References

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7. Appendices

Appendix A. Synar Survey Script

The adult supervisors trained the minor buyers to follow the protocol below.

Script and instructions

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

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,
Females pick up a pack of Camel Blues or ask, "How about a pack of Camel Blues?"
Males pick up a pack of Camels or ask, "How about a pack of Camels?"

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 or two dollars, then say, "I don't have enough money, never mind." Or "Sorry, I thought this was a $10 bill."
Then leave the store.

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

If the chewing tobacco is within reach,
Select a can of Skoal Wintergreen and place it on the counter.

If the chewing 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 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 or two dollars, 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 buyer offers to buy cigarettes for you,
Say, "No, thank you."
Then leave the store.

Appendix B. Synar Inspection Study Results

For every question on the 2011 Synar Inspection Form, WYSAC provides the unweighted frequencies, unweighted percentages, and weighted percentages (except items 6 and 7) in this appendix. WYSAC inspected 241 stores out of the 285 sampled. We omitted two stores from our analyses because of missing violation data. Thus, we have a *valid* total of 239 outlets. For every question (except for 6 and 7), we only report information for the 239 stores included in our analyses. For questions 6 and 7 (questions about eligibility and inspection status), we provide information on all 285 stores in the sample and do 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, reported percentages in this appendix may differ from those reported in the body of the report. For items with missing data, we provide explanations and unweighted frequencies of missing data.

1. Inspection month

	Frequency	Valid, unweighted percent	Valid, weighted percent
June	55	23.0	21.5
July	151	63.2	64.7
August	28	11.7	10.7
September	5	2.1	3.1
Valid total	239	100.0	100.0

2. Time of visit

	Frequency	Valid, unweighted percent	Valid, weighted percent
AM	129	54.0	53.3
PM	110	46.0	46.7
Valid total	239	100.0	100.0

3. Age of minor buyer

	Frequency	Valid, unweighted percent	Valid, weighted percent
Stores inspected by 15-year-olds	32	13.4	14.0
Stores inspected by 16-year-olds	129	54.0	50.5
Stores inspected by 17-year-olds	78	32.6	35.5
Valid total	239	100.0	100.0

4. Gender of minor buyer

	Frequency	Valid, unweighted percent	Valid, weighted percent
Stores inspected by young men	115	48.1	52.2
Stores inspected by young women	124	51.9	47.8
Valid total	239	100.0	100.0

5. Outlet county

	Frequency	Valid, unweighted percent	Valid, weighted percent
Laramie	27	11.3	14.5
Sweetwater	19	7.9	9.5
Natrona	16	6.7	8.4
Teton	14	5.9	7.1
Park	13	5.4	6.5
Fremont	16	6.7	6.0
Uinta	12	5.0	4.7
Sheridan	10	4.2	4.6
Carbon	13	5.4	4.5
Campbell	7	2.9	4.4
Albany	8	3.3	3.8
Goshen	7	2.9	3.6
Converse	7	2.9	3.2
Lincoln	14	5.9	3.1
Crook	11	4.6	2.5
Johnson	5	2.1	2.3
Big Horn	10	4.2	2.2
Sublette	10	4.2	2.2
Platte	7	2.9	2.0
Hot Springs	3	1.3	1.9
Weston	4	1.7	1.3
Niobrara	4	1.7	0.9
Washakie	2	0.8	0.8
Total	239	100.0	100.0

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

	Frequency	Valid, unweighted percent
Yes	248	87.0
No	37	13.0
Valid total	285	100.0

Note. Includes all tobacco retailers in the sample.

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

	Frequency	Valid, unweighted percent
Out of business	15	40.5
Does not sell tobacco products	12	32.4
Temporary closure	5	13.5
Inaccessible to youth	4	10.8
Could not locate	1	2.7
Valid total	37	100.0

Note. Includes only ineligible tobacco retailers from item 6.

7. If outlet is eligible, was inspection completed?

	Frequency	Valid, unweighted percent
Yes	241	97.2
No	7	2.8
Valid total	248	100.0
Ineligible	37	
Total*	285	

Note. Includes all tobacco retailers in the sample, including two outlets with completed inspections but missing violation data.

7a. If NO, mark one of the following reasons the inspection was not completed:

	Frequency	Valid, unweighted percent
Both youth inspectors know someone in the store	3	42.9
Other (specify): *see below*	2	28.6
Tobacco out of stock	1	14.3
Unsafe to access	1	14.3
Valid total	7	100.0

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

"Other" responses:

- Driver skipped the store without reporting a reason (1)
- Store open, but no sign of merchant, unattended (1)

8. Type of store

	Frequency	Valid, unweighted percent	Valid, weighted percent
Convenience (with gas)	169	70.7	69.9
Grocery store	40	16.7	15.4
Convenience (no gas)	9	3.8	2.8
Discount / Superstore (e.g., Wal-Mart, Target)	5	2.1	3.1
Pharmacy / Drug store	5	2.1	3.1
Restaurant / Cafe	5	2.1	2.3
Tobacco store	3	1.3	1.9
Other (specify): see below	3	1.3	1.5
Valid total	239	100.0	100.0

"Other" responses:

- Bowling alley
- Gift shop
- Music store

9. Location of cigarettes

	Frequency	Valid, unweighted percent	Valid, weighted percent
Not accessible (customers require assistance from an employee to obtain cigarettes)	235	98.7	98.5
Accessible (customers can pick up a pack of cigarettes without the assistance of an employee)	3	1.3	1.5
Valid total	238	100.0	100.0
No answer (was a chew inspection)	1		
Total	239		

10. Location of chewing tobacco

	Frequency	Valid, unweighted percent	Valid, weighted percent
Not accessible (customers require assistance from an employee to obtain cigarettes)	223	98.7	98.5
Accessible (customers can pick up a pack of cigarettes without the assistance of an employee)	3	1.3	1.5
Valid total	226	100.0	100.0
No answer (were cigarette inspections)	13		
Total	239		

Composite variable generated from location of cigarettes and location of chewing tobacco. Tobacco accessibility

	Frequency	Valid, unweighted percent	Valid, weighted percent
Not accessible (customers require assistance from an employee to obtain tobacco products)	222	98.7	98.5
Accessible (customers can pick up tobacco products without the assistance of an employee)	3	1.3	1.5
Valid Total	225	100.0	100.0
No answer on chew location (were cigarette inspections)	13		
No answer on cigarette location (was a chew inspection)	1		
Total	239		

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

	Frequency	Valid, unweighted percent	Valid, weighted percent
Yes	209	88.6	89.3
No	27	11.4	10.7
Valid total	236	100.0	100.0
No answer	3		
Total	239		

12. Clerk gender

	Frequency	Valid, unweighted percent	Valid, weighted percent
Woman	192	80.3	77.9
Man	47	19.7	22.1
Valid total	239	100.0	100.0

13. Approximate age of clerk

	Frequency	Valid, unweighted percent	Valid, weighted percent
18–24	30	12.6	12.3
25–34	64	26.8	30.4
35–44	56	23.4	22.2
45–54	45	18.8	18.9
55–64	28	11.7	11.1
65-85	16	6.7	5.2
Valid total	239	100.0	100.0

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

	Frequency	Valid, unweighted percent	Valid, weighted percent
Yes	21	8.8	8.7
No	218	91.2	91.3
Valid total	239	100.0	100.0

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

	Frequency	Valid, unweighted percent	Valid, weighted percent
$2.8-3.99	3	15.8	19.7
$4.00-4.99	9	47.4	48.5
$5.00-6.00	7	36.8	31.8
Valid Total	19	100.0	100.0
Missing Not Applicable	220		
Total	239		

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

	Frequency	Valid, unweighted percent	Valid, weighted percent
$2.80-3.99	1	7.7	12.0
$4.00-4.99	5	38.5	44.0
$5.00-6.00	7	53.8	44.0
Valid total	13	100.0	100.0

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

	Frequency	Valid, unweighted percent	Valid, weighted percent
$2.80-3.99	2	33.3	40.0
$4.00-4.99	4	66.7	60.0
$5.00-6.00	0	0	0.0
Valid total	6	100.0	100.0

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

Tobacco type	Frequency	Valid, unweighted percent	Valid, weighted percent
Cigarettes	196	82.0	82.4
Smokeless tobacco	43	18.0	17.6
Valid total	239	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 Golds	195	81.6	82.1
	Camel Blues	1	0.4	0.2
	Camels	0	0	0
Smokeless tobacco	Skoal Wintergreen	33	13.8	13.0
	Copenhagen Wintergreen	10	4.2	4.6
	Valid total	239	100.0	100.0

Note. Prior to June 2010, Marlboro Golds were marketed as Marlboro Lights; Camel Blues were marketed as Camel Lights.

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

	Frequency	Valid, unweighted percent	Valid, weighted percent
Yes	217	91.6	91.8
No	20	8.4	8.2
Valid total	237	100.0	100.0
No answer	2		
Total	239		

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

	Frequency	Valid, unweighted percent	Valid, weighted percent
Yes	4	1.7	1.4
No	225	98.3	98.6
Valid total	229	100.0	100.0
No answer	10		
Total	239		

Appendix C. Detailed Calculations for the Inspection Study

C.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 we 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 407 urban municipality outlets and 151 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, 2010, was 11.4% and the urban municipality RVR from last year, 2010, was 5.6%.
- **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 we 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 81% and 90% 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 96.1% and 99.4% 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 us 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. We used a safety margin of 10.0% for each stratum.

Once we 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 our design effect for both strata is 1, our effective sample size is the same as our target sample size.
- **Planned Original Sample Size** is the actual sample size we used to draw the sample. To compute this number, SSES inflates the target sample size using the accuracy and completion rates and incorporates the safety margin.

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

Synar Survey

State	WY Rural
FFY	2012
Date	6/3/2011 14:05

Input Information

Option for 95% Confidence Interval	One-Sided
Outlet Frame Size	151
Expected Retailer Violation Rate	11.40%
Design Effect	1
Expected Accuracy Rate	81%
Expected Completion Rate	96.10%
Safety Margin Used	10%

Sample Size

Effective Sample Size	101
Target(Minimum) Sample Size	101
Planned Original Sample Size	143

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

Synar Survey

State	WY Urban
FFY	2012
Date	6/3/2011 14:04

Input Information

Option for 95% Confidence Interval	One-Sided
Outlet Frame Size	407
Expected Retailer Violation Rate	5.60%
Design Effect	1
Expected Accuracy Rate	90%
Expected Completion Rate	99.40%
Safety Margin Used	10%

Sample Size

Effective Sample Size	115
Target(Minimum) Sample Size	115
Planned Original Sample Size	142

Based on the 2011 Synar results, the input values for the 2012 Synar inspections are as follows:

- Rural stratum
    - Expected RVR = 8.9%
    - Expected accuracy rate = 126/143 = 0.881 = 88.1%
    - Expected completion rate = 123/126 = .976 = 97.6%
- Urban stratum
    - Expected RVR = 8.6%
    - Expected accuracy rate = 122/142 = 85.9%
    - Expected completion rate = 116/122 = 95.1%

C.2. RVR Calculations

We 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:

$$407\ \frac{122}{142} + 151\ \frac{126}{143} = 482.7$$

We 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 2011 Synar inspection study was

$$\left(\frac{10}{116}\right)\left(\frac{122}{142}\right)\left(\frac{407}{482.7}\right) + \left(\frac{11}{123}\right)\left(\frac{126}{143}\right)\left(\frac{151}{482.7}\right) = .087\ \ or\ 8.7\%$$

C.3. Logistic Regression Methods

Because clerks asking for ID and clerks attempting to sell had a nearly perfect relationship, we were unable to generate a reliable and valid model of the RVR that would include whether clerks asked for ID (as WYSAC had done in 2009 and 2010). Because asking for ID could serve as an effective proxy for clerks attempting to sell and because both are behaviors that could be trained in clerks, we chose to model whether clerks ask for ID. Because of the shift in our modeled outcome variable, we could not use previous models to guide our model building process. Additionally, results are not comparable to previous years. We examined the following possible explanatory variables:

- Type of tobacco (cigarettes vs. smokeless tobacco),
- Tobacco brand,
- Sampling stratum,
- Morning/afternoon visit,
- Adult supervisor,
- Unique minor buyer identifier,
- Minor buyer gender,
- Minor buyer perceived age,
- Store type,
- Accessibility of tobacco (constructed from accessibility of cigarettes and smokeless tobacco, which were perfectly associated in all stores with complete data),
- Presence or absence of anti-tobacco signs,
- Clerk gender,
- Estimated clerk age (in categories as displayed in Appendix B), and
- Whether the clerk asked the minor buyer's age (omitted because very few clerks asked).

Prior to modeling the dependent variable of whether clerks asked for ID, we conducted crosstab analyses (Pearson chi-squared tests or Fisher's exact test, depending on cell counts) to identify likely predictors, variables that could not be modeled because of low frequency in certain conditions, and variables that could be recoded to simplify the modeling process. We also checked all predictors for multicollinearity by calculating Pearson correlations and found no problems. Several variables were significantly associated with whether clerks asked for ID (at the $\alpha = .05$ level):

- Type of tobacco (cigarettes vs. smokeless tobacco),
- Tobacco brand,
- Adult supervisor,
- Unique minor buyer identifier,
- Minor buyer gender,
- Minor buyer perceived age,
- Store type,
- Estimated clerk age (in categories as displayed in Appendix B), and
- Presence or absence of anti-tobacco signs (marginally significant).

Several variables had low frequencies in one or more categories. Very few (3) stores had accessible tobacco displays; very few (4) clerks asked minor buyers their age. Few minor buyers asked for our secondary brands (i.e., Camels—0 inspections, Camel Blues—1 inspection, and Copenhagen

Wintergreen—10 inspections). We omitted these variables from further analyses because it would not be possible to generate reliable estimates of their role in predicting whether clerks asked for ID.

We chose to recode two variables based on their possible role in predicting whether clerks ask for ID and the complex nature of the raw data. First, we found that one driver had a substantially higher RVR than the other drivers. Although this may be an artifact of the minor buyers with whom and regions where she or he worked, we coded a variable to account for any influence she or he may have had on the results. We coded the variable to contrast her or him against all other drivers.

Second, convenience stores (with or without gas) constituted the majority of inspected outlets. Several other store types (e.g., tobacco stores, restaurants/cafes) were inspected too infrequently for reliable analyses. Therefore, we dichotomized store type as conveniences stores (with or without gas) vs. all other store types for further analyses.

WYSAC modeled the data using logistic regression because we had a binary response variable with multiple explanatory variables. Early in the modeling process, we found that unique minor buyer identifier was redundant with minor buyer gender and whether the minor buyer was perceived as 18 or older. Therefore, we omitted this variable from further analyses. Initially we examined a full model with the predictor variables as described above. However, some of these predictor values were neither statistically significant (when controlling for the effects of the other predictors) nor contributed to model fit.

We present details about our final model in tables C-3 through C-7. Although minor buyer gender and the sampling stratum were not statistically significant predictors, we retained them in the model because they improved the model fit compared to a model with only the statistically significant predictors (as shown by comparisons of model fit with the Hosmer and Lemeshow test). We calculated Akaike's Information Criterion (AIC) by hand:

$$AIC = -2\log \text{likelihood} + 2\,(\#\text{ of parameters}) = 223.953 + 2\,(6) = 235.953$$

One limitation of our logistic regression model is that we had low cell counts on several included variables, mainly because relatively few clerks did not ask for ID (8.2%). Additionally, only 17.6% of the inspections were for smokeless tobacco. Low cell counts can increase variability in the model thereby increasing confidence intervals. The low cell counts in our model also prevented us from properly testing interaction effects.

Table C-3. Coding of Categorical Variables

Variable		Parameter coding
Asked for ID (predicted variable)	Asked for identification/likely did not violate	0
	Did not ask for identification/likely violated	1
Tobacco type	Cigarettes	1
	Smokeless tobacco	0
Minor buyer perceived age	Under 18	1
	18 or older	0
Minor buyer gender	Young man	1
	Young woman	0
Selected driver versus other drivers	Other drivers	1
	Selected driver	0
Stratum	Urban	1
	Rural	0

Table C-4. Final Logistic Regression Model

Variable	B	Standard error	Wald	Degrees of freedom	*p*	Odds ratio	95% Confidence interval for odds ratio	
							Lower bound	Upper bound
Type of tobacco	-0.917	0.401	5.225	1	.022	0.400	0.182	0.877
Perceived age of minor buyer	-1.028	0.430	5.725	1	.017	0.358	0.154	0.830
Minor buyer gender	0.612	0.403	2.307	1	.129	1.845	0.837	4.065
Clerk's estimated age	-0.033	0.014	5.441	1	.020	0.967	0.941	0.995
Recoded adult supervisor	-1.357	0.401	11.460	1	.001	0.257	0.117	0.565
Sampling stratum	-0.517	0.406	1.615	1	.204	0.597	0.269	1.323
Constant	0.871	0.838	1.081	1	.298	2.390		

Table C-5. Classification Table Based on Final Logistic Regression Model

Observed	Predicted		
	Asked for identification/likely did not violate	Did not ask for identification/likely violated	Percentage
Asked for identification/likely did not violate	323	109	74.7
Did not ask for identification/likely violated	14	24	63.6
Overall Percentage			73.8

Note. The cut value is .082, the percentage of clerks who did not ask for ID.

Table C-6. Hosmer and Lemeshow Test of Model Fit

Chi-square	Degrees of freedom	*p*
6.737	8	.565

Note. A non-significant finding ($p > .05$) indicates good model fit.

Table C-7. Final Logistic Regression Model Summary

-2 Log likelihood	Cox and Snell R Square	Nagelkerke R Square
223.953[a]	.085	.198

Appendix D. Inspection Information for CSAP's FY2012 Annual Synar Report

This appendix provides the information WDH-BHD needs to complete the FFY 2012 Annual Synar Report (ASR) for the Substance Abuse and Mental Health Services Administration (SAMHSA). In this appendix, WYSAC provides answers to the ASR questions that are specific to the inspections. All other answers are more appropriately determined by WDH-BHD; however, WYSAC is available for technical assistance.

Section I: Question 6–9

- Question 6. No, the sampling methodology has not changed since the 2010 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. We will also email electronic copies of the SSES output to WDH-BHD.
- Questions 7b–7h not required because we used SSES.
- Question 8. Yes, WYSAC used a list frame.
    - 8a. 2010
    - 8b. 88.6%
    - 8c. No
    - 8d. 2013
- Question 9. Yes, the inspection protocol has changed since 2010. Prior to June 2010, Marlboro Golds were marketed as Marlboro Lights; Camel Blues were marketed as Camel Lights. In 2010, minor buyers could ask for cigarettes by either brand name. In 2011, minor buyers only asked for Marlboro Golds or Camel Blues, as opposed to Lights. We also trained minor buyers to ask for specific flavors cuts of smokeless tobacco to improve the realism of purchase attempts. WYSAC added these details to the 2011 protocol.
    - 9a. WYSAC conducted the inspections between 06/26/11 and 09/13/11.
    - 9b. Seventeen youth inspectors participated in the 2011 Synar Survey. One young man turned 16 during his inspection work; he completed some inspections as a 15-year-old and others as a 16-year-old. WYSAC recorded his age at the time of each inspection, as suggested for SSES analyses. Therefore, he has two youth ID numbers in the SSES output
    - 9c. Form 5 is not required because we used SSES.

Section II: Question 1 and 3

- Question 1. No, we do not anticipate any changes in the Synar sampling methodology or the Synar inspection protocol.
- Question 3. WDH-BHD 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:
    - Limitations on completeness/accuracy of list tobacco outlets
    - Difficulties recruiting youth inspectors
    - Geographic, demographic, and logistical considerations in conducting inspections

Appendix A: Forms

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

Appendix B: Questions 1–10

- Question 1. WYSAC used a *list frame* sampling method.
- Question 2: Please see Section 3.1 of our report for details. WDH-BHD may complete this list as appropriate. Annually, we update the list frame from the Synar inspections and, when available, the coverage study.
- Question 3. Skip this question because we used a list frame, not an area frame.
- Question 4. We do 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 we did not use a systematic sampling method.
- Question 7: Information about stratification:
    - 7a. We categorized each outlet into one of two strata. We 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. We did not use clustering within the stratified sample.
- Question 8: Skip this question because we did not use clustering.
- Question 9: WYSAC used SSES to calculate the effective, target, and original sample sizes. We ran SSES twice, once for the rural stratum and once for the urban stratum. This increases our sample size and reduces error.
- Question 10a.
    - For the rural stratum
        - RVR: 8.9%
        - Frame Size: 151
        - Design Effect: 1
        - Safety Margin: 10%
        - Accuracy (Eligibility) Rate: 88.1%
        - Completion Rate: 97.6%
    - For the urban stratum
        - RVR: 8.5%
        - Frame Size: 407
        - Design Effect: 1
        - Safety Margin: 10%
        - Accuracy (Eligibility) Rate: 85.9%
        - Completion Rate: 96.7%
- Question 10b. Skip this question because we used SSES.

Appendix C: Questions 1–7

Note: We have attached the Synar inspection form as Appendix E of the technical report and as a separate file. Upload this form to WebBGAS under the heading "Synar Inspection Form." Upload Section 3.2 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*.
  - 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: WYSAC recruited adults from Laramie to fill the adult supervisor role. Prior to hiring the adult supervisors, WYSAC conducted criminal background checks and reviewed driving records. They trained all adult supervisors in Synar protocol. The adult supervisors were then responsible for training the minor buyers. WYSAC recruited most minor buyers by asking previous buyers to provide referrals. Program managers in the Tobacco-Free Wyoming Communities Program also provided contacts. WYSAC first contacted potential minor buyers via telephone to describe the project and speak with one of their parents or guardians. Once the minor buyer 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. Two 15-year-olds, eight 16-year-olds, and six 17-year-olds participated in the 2011 Synar inspection study. Additionally, one young man turned 16 during his inspection work; he completed some inspections as a 15-year-old and others as a 16-year-old. WYSAC recorded his age at the time of each inspection, as suggested for SSES analyses. Each of the 12 teams included both a male and female minor buyer. All minor buyers 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 minor buyers to observe and describe certain aspects of the stores and clerks (i.e., the location of tobacco products, the presence of anti-tobacco messages the approximate age of the clerk, and the gender of the clerk).
- Question 5: Legal or procedural requirements instituted by the state to address the issue of youth inspectors' immunity during inspections:
  - 5a. We instituted no legal requirements.
  - 5b. Yes. Youth inspectors are not permitted to have identification on them during the inspection, helping to maintain confidentiality of their identity. 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 6: 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:
  - 6a. We instituted no legal requirements.
  - 6b. Yes. All minors participating in the program must have parental approval and a signed consent form. These minor buyers 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 7: Legal or procedural requirements instituted by the state regarding how inspections are to be conducted:

- 7a. We instituted no legal requirements.
- 7b. Minors are required to be 15-17 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 fifth 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)	2012
Date	10/20/2011 13:18
Data	Final SSES file.xlsx
Analysis Option	Stratified SRS with FPC

Estimates

Unweighted Retailer Violation Rate	8.8%
Weighted Retailer Violation Rate	8.7%
Standard Error	1.6%
Is SAMHSA Precision Requirement met?	YES
Right-sided 95% Confidence Interval	[0.0%, 11.3%]
Two-sided 95% Confidence Interval	[5.7%, 11.8%]
Design Effect	1.2
Accuracy Rate (unweighted)	87.0%
Accuracy Rate (weighted)	86.5%
Completion Rate (unweighted)	96.4%

Sample Size for Current Year

Effective Sample Size	216
Target (Minimum) Sample Size	216
Original Sample Size	285
Eligible Sample Size	248
Final Sample Size	239
Overall Sampling Rate	49.5%

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

STATE: WY

FFY: 2012

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	407	350	N/A	N/A	142	122	116	10	8.6%	
2	2	151	133	N/A	N/A	143	126	123	11	8.9%	
Total		558	483			285	248	239	21	8.7%	1.6%
Over the Counter Outlets											
1	1	407	350	N/A	N/A	142	122	116	10	8.6%	
2	2	151	133	N/A	N/A	143	126	123	11	8.9%	
Total		558	483			285	248	239	21	8.7%	1.6%
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: 2012

Disposition Code	Description	Count	Subtotal
EC	Eligible and inspection complete outlet	239	
Total (Eligible Completes)			239
N1	In operation but closed at time of visit	0	
N2	Unsafe to access	1	
N3	Presence of police	0	
N4	Youth inspector knows salesperson	3	
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	1	
N8	Run out of time	0	
N9	Other noncompletion (see below)	4	
Total (Eligible Noncompletes)			9
I1	Out of Business	15	
I2	Does not sell tobacco products	12	
I3	Inaccessible by youth	4	
I4	Private club or private residence	0	
I5	Temporary closure	5	
I6	Can't be located	1	
I7	Wholesale only/Carton sale only	0	
I8	Vending machine broken	0	
I9	Duplicate	0	
I10	Other ineligibility	0	
Total (Ineligibles)			37
Grand Total			285

Give reasons and counts for other noncompletion:

Reason	Count
Driver skipped the store without reporting a reason	1
Store open, but no sign of merchant, unattended	1
Driver did not complete violation flag item on form	2

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

STATE: WY
FFY: 2012

Frequency Distribution

Gender	Age	Number of Inspectors	Attempted Buys	Successful Buys
Male	14	0	0	0
	15	2	19	2
	16	4	57	5
	17	3	48	9
	18	0	0	0
	Subtotal	9	124	16
Female	14	0	0	0
	15	1	13	0
	16	5	72	1
	17	3	30	4
	18	0	0	0
	Subtotal	9	115	5
Other		0	0	0
Grand Total		18	239	21

Buy Rate in Percent by Age and Gender

Age	Male	Female	Total
14	0.0%	0.0%	0.0%
15	10.5%	0.0%	6.3%
16	8.8%	1.4%	4.7%
17	18.8%	13.3%	16.7%
18	0.0%	0.0%	0.0%
Other			0.0%
Total	12.9%	4.3%	8.8%

Appendix E. Synar Inspection Form 2011

The Synar Inspection Form for 2011 is on the following two pages.

2011 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 <u>one</u> 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 <u>one</u> 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

2011 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)

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)

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

○ Yes ○ No

Clerk Gender:

○ Male ○ Female

Approximate Age of Clerk: __ __

If inspection was completed, was buy attempt successful?

○ Yes ○ No

↓

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

What type of tobacco did the youth inspector ask for? (Every fifth 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