

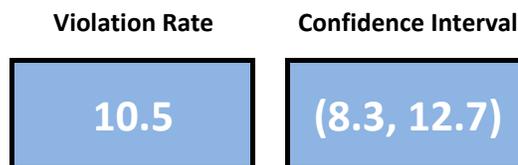
Introduction

The Synar survey was established in July 1992 when Congress enacted the Alcohol, Drug Abuse and Mental Health Administration (ADAMHA) Reorganization Act (P.L. 102-321), which includes the Synar Amendment (named for its sponsor, former congressman Mike Synar of Oklahoma). One of the core requirements of this amendment is to conduct random, unannounced inspections of outlets that sell tobacco. Pennsylvania's Annual Synar survey is designed to satisfy this federally regulated requirement and is intended to estimate the rate at which outlets sell cigarettes to minors (known as the retail violation rate or RVR).

The survey is conducted by youth buyers, ages 15-17, who attempt to purchase cigarettes from a sample of Pennsylvania cigarette retailers. The outcome of each attempt is recorded and a rate is calculated from the eligible outlets attempted. The 2015 survey was conducted during the summer of 2015.

Statewide Results

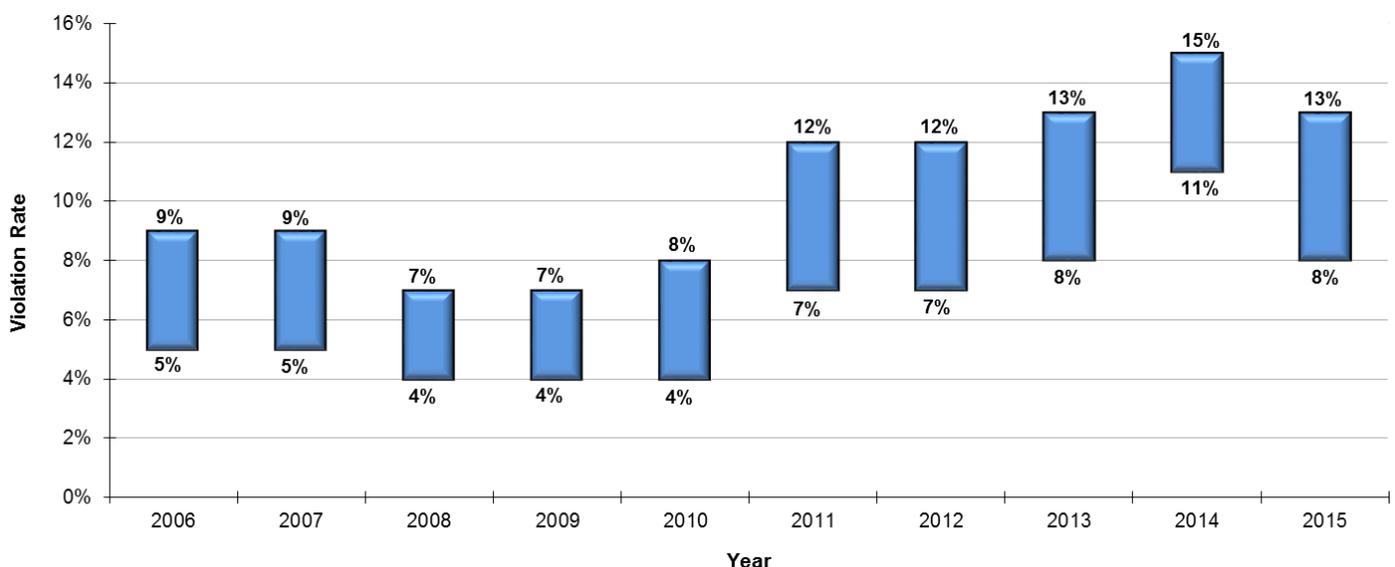
In 2015, an estimated 8 to 13 percent of Pennsylvania cigarette retailers sold cigarettes to minors. The estimate was calculated from the results of the 2015 Synar survey and used a 95 percent confidence interval with weighted violation rate (10.5 percent) and standard error (1.1).



Historical Results

Pennsylvania has annually conducted the Synar survey since 1996. Significance tests (Rao-Scott Chi-Square) were used to examine the relationships between the 2015 statewide violation rate and the prior survey violation rates that used the current survey design (2004-2015). The tests demonstrated that the 2015 violation rate is not statistically different from the 2005, 2011, 2012, 2013 and 2014 violation rates but is statistically different from the 2004, 2006, 2007, 2008, 2009 and 2010 violation rates.

Graph 1. Pennsylvania retail violation rates of the last 10 years (2006-2015)



Results by Region

Prior to sampling, every eligible outlet on the sample list is placed into one of 10 mutually exclusive and exhaustive geographical regions (**Figure 1**). The geographical regions are the Northcentral (NC), Northeast (NE), Northwest (NW), Southcentral (SC), Southeast (SE) and Southwest (SW) of Pennsylvania plus the four individual counties: Allegheny (AL), Delaware (DE), Erie (ER) and Philadelphia (PH). Pennsylvania's sampling methodology allows for valid estimates from each region (**Table 1**).

Figure 1. 2015 Synar Region Map

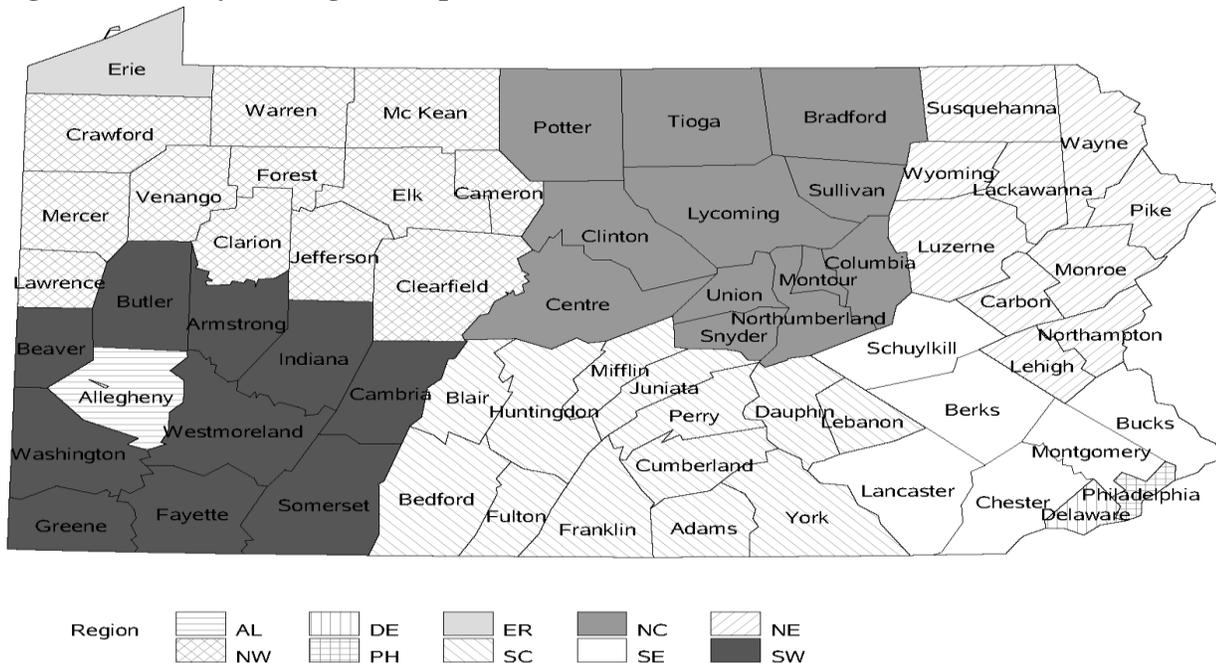


Table 1. 2015 Synar Region Results

Region	Abbr.	Outlets selected	Outlets completed	Total violations	Weighted rate	Standard error	Lower limit	Upper limit
Statewide	State	1753	1237	108	10.5	1.1	8.3	12.7
Northcentral	NC	119	78	4	5.1	1.6	1.9	8.3
Northeast	NE	233	159	15	9.6	3.2	3.4	15.8
Northwest	NW	119	78	3	3.8	2.6	0.0	9.0
Southcentral	SC	181	144	12	8.1	2.2	3.8	12.3
Southeast	SE	322	210	6	2.9	1.5	0.0	5.9
Southwest	SW	194	150	8	5.5	4.2	0.0	13.7
Allegheny	AL	130	95	5	5.3	2.3	0.7	9.8
Delaware	DE	110	71	8	11.3	3.8	3.8	18.7
Erie	ER	100	69	5	7.2	3.1	1.1	13.4
Philadelphia	PH	245	183	42	23.0	3.1	16.8	29.1

Note1: Confidence limits were calculated using the t-distribution with the degrees of freedom (df) determined by subtracting the total strata from the total clusters. For example, the df for Northcentral is 5 because there are 6 clusters and 1 stratum.

Note2: The weighted rate takes into account unequal probabilities of selection and non-completions. It is different than the unweighted rate which is calculated by dividing "Total violations" by "Outlets completed." The weighted rate should be used at all times.

Note3: When "Total violations" = 0, the "Rule of Three (3/n)" is used to calculate Upper limit.

Note4: The rate was marked n/a if "Outlets completed" was below 40.

Significance tests (Rao-Scott Chi-Square) and odds ratio calculations were used to examine the relationships between regions with more than 50 completed visits.

- ❖ The **Philadelphia (PH)** retail violation rate is significantly different from every other region.
- ❖ The **Northcentral region (NC)** retail violation rate is statistically different from the Philadelphia (PH) rate. Youth buyers are approximately 5.5 times more likely to be sold cigarettes in PH than in NC.
- ❖ The **Northeast region (NE)** retail violation rate is statistically different from the Philadelphia (PH) rate. Youth buyers are approximately 2.8 times more likely to be sold cigarettes in PH than in NE.
- ❖ The **Northwest region (NW)** retail violation rate is statistically different from the Philadelphia (PH) rate. Youth buyers are approximately 7.4 times more likely to be sold cigarettes in PH than in NW.
- ❖ The **Southcentral region (SC)** retail violation rate is statistically different from the Philadelphia (PH) rate. Youth buyers are approximately 3.4 times more likely to be sold cigarettes in PH than in SC.
- ❖ The **Southeast region (SE)** retail violation rate is statistically different from the rates of the Northeast (NE), Delaware (DE), and Philadelphia (PH). Youth buyers are approximately 3.6 times more likely to be sold cigarettes in NE, 4.3 times in DE and 10.2 times in PH than in SE.
- ❖ The **Southwest region (SW)** retail violation rate is statistically different from the Philadelphia (PH) rate. Youth buyers are approximately 5.1 times more likely to be sold cigarettes in PH than in SW.
- ❖ The **Allegheny (AL)** retail violation rate is statistically different from the Philadelphia (PH) rate. Youth buyers are approximately 5.4 times more likely to be sold cigarettes in PH than in AL.
- ❖ The **Delaware (DE)** retail violation rate is statistically different from the Philadelphia (PH) rate. Youth buyers are approximately 2.3 times more likely to be sold cigarettes in PH than in DE.
- ❖ The **Erie (ER)** retail violation rate is statistically different from the Philadelphia (PH) rate. Youth buyers are approximately 3.8 times more likely to be sold cigarettes in PH than in ER.

Results by Youth Gender

Male youth attempted to purchase cigarettes in 770 different outlets, while females attempted this in 467 (**Table 2**). The relationship between the rates at which cigarettes were sold to males and females was statistically examined. The significance test showed that the rates are not statistically different.

Table 2. Results by Youth Gender

Gender	Total visited	Violations	Weighted rate	Lower limit	Upper limit
Male	770	67	10.4	7.9	13.0
Female	467	41	10.6	6.8	14.4

Note: The weighted rate takes into account unequal probabilities of selection and non-completions. It is different than the unweighted rate which is calculated by dividing the "Violations" by the "Total visited." The weighted rate should be used at all times.

Results by Youth Age

The age of the youth surveyors ranged from 15 to 17 years old (Table 3). A significance test and odds ratio calculation was used to examine the relationships between the age of the buyer and the violation rate. There was a significant difference between the rate at which outlets sold cigarettes to 15-and 16-year-olds, to 15-and 17-year-olds, and to 16-and 17-year-olds. Based on the odds ratio, a 16-year-old is 3.0 times more likely to be sold cigarettes to than a 15-year-old; a 17-year-old is 9.0 times more likely to be sold to than a 15-year-old; and a 17-year-old is 3.0 times more likely to be sold to than a 16-year-old.

Table 3. Results by Youth Age

Age	Total visited	Violations	Weighted rate	Lower limit	Upper limit
15	532	17	3.0	1.1	4.8
16	425	35	8.4	5.4	11.3
17	280	56	21.7	16.0	27.3

Note: The weighted rate takes into account unequal probabilities of selection and non-completions. It is different than the unweighted rate which is calculated by dividing the "Violations" by the "Total visited." The weighted rate should be used at all times.

Results by Youth Race

A significance test and odds ratio calculation was used to examine the relationships between the race of the buyer and the violation rate. There was a significant difference between the rate at which outlets sold cigarettes to black buyers and white buyers and to black buyers and buyers who listed their race as other. Black buyers were 4.2 times more likely to be sold cigarettes than white buyers and 19.4 times more likely to be sold to than buyers who listed their race as other.

Table 4. Results by Youth Race

Race	Total visited	Violations	Weighted rate	Lower limit	Upper limit
White	897	56	6.3	4.1	8.5
Black	258	50	22.0	16.2	27.7
Asian	12	1	8.3	0.0	24.1
Other	69	1	1.4	0.0	4.1

Note: The weighted rate takes into account unequal probabilities of selection and non-completions. It is different than the unweighted rate which is calculated by dividing the "Violations" by the "Total visited." The weighted rate should be used at all times.

Results by Youth Ethnicity

Youth buyers who described themselves as Hispanic attempted to purchase cigarettes in 61 different outlets, while Non-Hispanics attempted this in 1170 (Table 5). The relationship between the rates at which cigarettes were sold to Hispanics and non-Hispanics was statistically examined. The significance test showed that the rates are not statistically different.

Table 5. Results by Youth Ethnicity

Gender	Total visited	Violations	Weighted rate	Lower limit	Upper limit
Hispanic	61	4	6.6	0.0	15.4
non-Hispanic	1170	102	10.6	8.3	12.9

Note: The weighted rate takes into account unequal probabilities of selection and non-completions. It is different than the unweighted rate which is calculated by dividing the "Violations" by the "Total visited." The weighted rate should be used at all times.

Results by Clerk Gender

The relationship between the rates at which cigarettes were sold by male and female clerks was statistically examined. The significance test showed that the rates are not statistically different.

Table 6. Results by Clerk Gender

Gender	Total visited	Violations	Weighted rate	Lower limit	Upper limit
Male	508	51	11.8	8.6	15.1
Female	724	57	9.6	7.0	12.2

Note: The weighted rate takes into account unequal probabilities of selection and non-completions. It is different than the unweighted rate which is calculated by dividing the "Violations" by the "Total visited." The weighted rate should be used at all times.

Distribution of Outlet Types

Cigarettes are sold by a variety of outlets in Pennsylvania. Based on the surveyor's description, each outlet was categorized. The 2015 outlet definitions can be found in the technical notes. The distribution of outlets is shown in **Table 7**. Over 66 percent of the surveyed outlets belong to the convenience-gas, convenience-no gas or supermarket category.

Table 7. Distribution of Sampled Outlets

Outlet Type	Visited	Percent
Bar/tavern	22	1.8%
Beer distributor	71	5.7%
Convenience -- gas	395	31.9%
Convenience -- nogas	309	25.0%
Dollar store	86	7.0%
Pharmacy/drug store	68	5.5%
News outlet	12	1.0%
Restaurant/deli	68	5.5%
Supermarket	130	10.5%
Tobacco	45	3.6%
Other	31	2.5%
TOTAL	1237	100%

Results by Outlet Type

The rate at which cigarettes were sold by outlet type was statistically examined. Significance tests were performed among each pair of categorized outlets with at least 50 visits to each outlet type.

Table 8. Results by Outlet Type

Outlet type	Total visited	Violations	Weighted rate	Lower limit	Upper limit
Bar/tavern	22	2	n/a	n/a	n/a
Beer distributor	71	5	8.5	1.4	15.5
Convenience -- gas	395	29	7.6	4.9	10.4
Convenience -- nogas	309	37	13.4	9.0	17.8
Dollar store	86	3	4.1	0.0	9.8
Pharmacy/drug store	68	4	8.9	0.4	17.3
News outlet	12	2	n/a	n/a	n/a
Restaurant/deli	68	19	29.7	18.2	41.2
Supermarket	130	3	3.1	0.0	6.6
Tobacco	45	3	5.7	0.0	12.3
Other	31	1	n/a	n/a	n/a

Note1: The weighted rate takes into account unequal probabilities of selection and non-completions. It is different than the unweighted rate which is calculated by dividing the "Violations" by the "Total visited." The weighted rate should be used at all times.

Note2: The rate was marked n/a if "Total visited" was below 40.

Restaurants/delis are 4.6 times more likely to sell cigarettes to minors than beer distributors, 5.1 times more likely than convenience -- gas stores, 2.7 times more likely than convenience -- no gas stores, 9.9 times more likely than dollar stores, 4.3 times more likely than pharmacies/drug stores and 13.3 times more likely to sell cigarettes to minors than supermarkets. Convenience -- no gas stores are 1.9 times more likely to sell cigarettes to minors than convenience -- gas stores and 4.9 times more likely than supermarkets.

Conclusions

Synar results are not valid for state-to-state OR state-to-nation comparisons due to the differences in designs, sampling frames and quality. However, there is merit in comparing Pennsylvania to itself. The federal government sets maximum allowable violation rates for each state, including Pennsylvania. Pennsylvania is expected to be at or below the rates shown in **Table 9**. The Synar survey only measures the violation rates, it cannot lower them. Violation rates must be lowered through enforcement or other methods. In 1999, Pennsylvania was penalized for exceeding the maximum allowable rate set by the Center for Substance Abuse Prevention (CSAP). The penalty prompted a massive statewide campaign of enforcement, public awareness and education that still continues today. According to the data obtained from the Synar survey, Pennsylvania's prevention efforts appear to be successful. The estimated violation rate dropped significantly after the first few years of the campaign and eventually leveled off well below federal targets. Since 2002, the violation rate has been significantly lower than the federal target rate of 20 percent (**Graph 2**).

Table 9. Max Rates vs. Actual Survey Rates

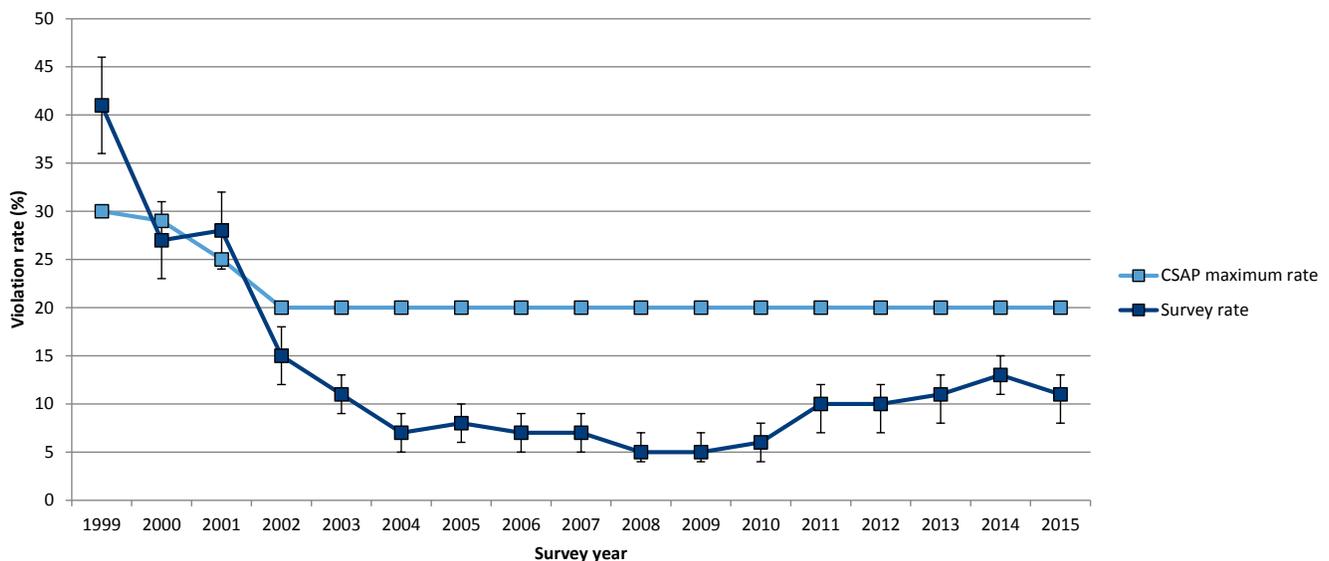
Year	Original max rate	Revised* max rate	Survey rate	Survey error
1996	Baseline	n/a	50%	± 12%
1997	42%	n/a	30%	± 6%
1998	31%	n/a	31%	± 5%
1999	25%	30%	41%	± 5%
2000	20%	29%	27%	± 4%
2001	20%	25%	28%	3%
2002	20%	20%	15%	3%
2003	20%	20%	11%	2%
2004	20%	20%	7%	2%
2005	20%	20%	8%	2%
2006	20%	20%	7%	2%
2007	20%	20%	7%	2%
2008	20%	20%	5%	2%
2009	20%	20%	6%	2%
2010	20%	20%	6%	2%
2011	20%	20%	10%	2%
2012	20%	20%	10%	2%
2013	20%	20%	11%	2%
2014	20%	20%	13%	2%
2015	20%	20%	11%	2%

*Revised 3/8/00

Note1: Since 2001, CSAP has required a one-sided 95% C.I.

Note2: All rates and errors are rounded to the nearest percent.

Graph 2. Allowable Max Rates vs. Actual Survey Rates



Technical Notes

Background

The U.S. Department of Health and Human Services clarified the Synar Amendment by issuing the Synar Regulation in January of 1996. Substance Abuse and Mental Health Services Administration (SAMHSA), an agency of the U.S. Department of Health and Human Services, was chosen to implement the regulation. CSAP is an agency of SAMHSA in charge of this regulation. According to the “Synar Regulation Implementation Report,” each state must:

- Have in effect a law prohibiting any manufacturer, retailer or distributor of tobacco products from selling or distributing such products to any individual under the age of 18;
- Enforce such laws in a manner that can reasonably be expected to reduce the illegal sales of tobacco products to individuals under the age of 18;
- Conduct annual, random, unannounced inspections to ensure compliance with the law to be conducted in such a way as to provide a valid probability sample of outlets accessible to youth;
- Develop a strategy and negotiate with SAMHSA a timeframe for achieving an inspection failure rate of less than 20 percent of outlets accessible to youth; and
- Submit an annual report describing in detail the state's survey methodology and activities to enforce its law.

Failure to meet the requirements of the Synar Regulation could result in graduated penalties against a state's Substance Abuse Prevention and Treatment (SAPT) Block Grant, as specified in the statute. The intent of the survey is to assess the effectiveness of Pennsylvania's enforcement programs by measuring the rate at which outlets sell cigarettes to minors. If the rate is high, then enforcement is failing. The survey does not lower the rate, it only measures it.

How Pennsylvania Met SAMHSA Survey Requirements

SAMHSA clarified the Synar Regulation and provided specific survey requirements in the “Synar Regulation: Sample Design Guidance (May 2003).” Below is a list of these requirements and how Pennsylvania fared in 2015.



Obtain approval from SAMHSA in writing for any changes in sampling methodology prior to implementation of the Synar survey.

There were no methodology changes for the 2015 survey.



Develop a sampling frame that includes both over-the-counter and vending machine locations accessible to youth.

Pennsylvania only samples over-the-counter locations. Act 2002-112 restricted the placement of vending machines to locations inaccessible to minors. Since vending machines could only be located in areas inaccessible to minors, SAMHSA approved the exclusion of vending machines from the Pennsylvania survey.



Develop a sampling frame that includes, at a minimum, 80 percent of the tobacco outlets in the state.

Pennsylvania develops the sampling frame from the Department of Revenue's Cigarette License File (CLF). Pennsylvania requires a license to sell cigarettes, and the CLF contains a complete list of all locations licensed to sell cigarettes. The latest coverage survey, conducted in 2013, estimated that Pennsylvania's sampling frame included 99.5 percent of the tobacco outlets in the state.



Select a sample of outlets to inspect that is representative of the geographic distribution of all tobacco outlets accessible to youth in the state. Decide whether to use clustering or stratification or both.

Pennsylvania used both clustering and stratification and was representative of the geographic distribution. The sample size for each stratum roughly mirrored the population distribution of outlets.



Design a sampling methodology and implementation plan that are based on sound survey sampling methodology. Choose a sample design and decide on a random sampling method for each stage of sampling.

Pennsylvania used a sound methodology and implementation plan with a valid probability sample for which the probability of selection for each outlet was nonzero. A two-stage sampling design was used, and the first stage selected PSUs from within each stratum using probability proportionate to size (PPS) sampling technique. Stage two involved randomly selecting a pre-determined number of outlets from each of the sampled PSUs.



Estimate the original sample size before implementing the Synar survey. Base the estimate of the original sample size on the results of calculations of the minimum sample size needed to meet SAMHSA's precision requirement, plus extra sample needed to account for the expected completion rate and the expected accuracy rate.

Pennsylvania calculated the sample size by first calculating the Effective Sample Size. According to CSAP requirements, the width (w) of the upper limit of the confidence interval (C.I.) must be less than or equal to 3 percent. Using the equation for the upper limit of a 95 percent C.I. of the sample mean \bar{x} gives

$$\bar{x} + w \quad (S1)$$

applying the CSAP requirement for w gives

$$w \leq 3 \quad (S2)$$

Where w is defined as

$$w = z(s.e.) \quad (S3)$$

Substituting S3 into S2

$$z(s.e.) \leq 3 \quad (S4)$$

Where z is the critical value of the standard normal distribution for a one sided 95 percent C.I. and $s.e.$ is the standard error or standard deviation estimated from the sample data. Substituting 1.645 for z and solving equation S4 for $s.e.$ gives

$$s.e. \leq \frac{3}{1.645} \leq 1.82$$

Therefore the $s.e.$ must be less than or equal to 1.82 to maintain a width of 3 percent or less for a right-sided 95 percent C.I.

Ignoring the finite population correction, the *s.e.* is defined as,

$$s.e. = \frac{\sqrt{p(1-p)}}{\sqrt{n_e}} \quad (S5)$$

Substituting S5 into S3 gives

$$w = z \left(\frac{\sqrt{p(1-p)}}{\sqrt{n_e}} \right)$$

Solving for n_e gives the equation for the effective sample size

$$n_e = \left(\frac{z}{w} \right)^2 p(1-p),$$

Where $z = 1.645$, $w = 0.03$ (both z and w are based on 95 percent one-sided C.I. with tolerance of 3 percent) and $p = 3$ percent over the target rate (20 percent + 3 percent = 23 percent).

Next, the target sample size was calculated using the equation:

$$n_t = \text{Deff}_h \times n_e,$$

Where Deff_h is the highest design effect from historical Synar surveys of a similar design.

Finally, the original sample size is calculated using the combined equation:

$$n_o = \frac{n_t}{r_l r_c} + n_A + n_S;$$

r_l = lowest eligibility rate of historical Synar surveys of similar design.

r_c = lowest completion rate of historical Synar surveys of similar design or 80 percent (whichever is lower).

n_A = sample added or subtracted needed to fit the clustered sample design.

n_S = supplemental sample.

n_A is the number of sample added or subtracted to guarantee that our precision goals are met and the sample size fits the design. The size of n_A is estimated after reviewing output created by a SAS program designed to simulate survey outcomes with varying designs. n_S is the number of supplemental sample allocated to the clustered areas due to sample attrition. Supplemental sample is issued if a cluster does not obtain the minimum number of completions allowed per cluster.



SAMHSA requires the results to be reported with a right-sided 95 percent confidence interval. The precision requirement for the estimate of the violation rate must have the right-side limit within 0.03 or 3 percentage points from the violation rate estimate. Using the normal distribution, the requirement can be translated into the statement that 1.645 times the standard error (s.e.) of the estimate be within 0.03. That is, $1.645 \times s.e. \leq 0.03$ or $s.e. \leq \frac{0.03}{1.645} = 0.0182$

Pennsylvania is required to report the results of the survey within the Annual Synar Report (ASR). The confidence interval (C.I.) reported in the ASR is different than what is reported in this document because of rounding error and the different methods of calculation. The ASR requires a one-sided C.I. that assumes a normal distribution. This document employs a two-sided C.I. assuming a t-distribution. Confidence intervals may be either one-sided or two-sided, although a two-sided C.I. is most commonly used. In the case of the ASR, where the objective is to determine whether the retailer violation rate is equal to or less than the state target rate (20 percent), the right-sided C.I. is used by the federal government, rather than the two-sided interval.

The right-sided 95 percent C.I. is always bounded by zero on the left. The right-side limit is given by (violation rate estimate) + (critical value for a normal one-sided 95 percent C.I.) \times (standard error of the estimate). The two-sided 95 percent C.I. used in this report and most publications is calculated by (violation rate estimate) + (critical value for a t-distribution two-sided 95 percent C.I.) \times (standard error of the estimate). The critical value for a normal one-sided 95 percent C.I. is always 1.645 and critical value for a t-distribution two-sided 95 percent C.I. approaches 1.96 as the sample size increases. For example, if the violation rate = 10.5, standard error = 1.1 and there is a sufficiently large sample size, then the confidence intervals for the two methods are calculated as follows:

95 percent one-sided C.I. (Normal-dist)
 $10.5 + (1.645 \times 1.1) = [0, 12.3]$

95 percent two-sided C.I. (t-dist)
 $10.5 \pm (1.96 \times 1.1) = [8.3, 12.7]$

The precision level was achieved for the 2015 survey. The survey had a standard error of 0.0110, which is less than the required 0.0182.



Determine a method of selecting additional outlets to inspect should it not be possible to reach the required minimum number of completed inspections due to sample attrition.

Pennsylvania uses an approved supplemental sample system for which additional outlets are issued when a minimum of 13 outlets aren't completed per cluster and a minimum of 60 outlets aren't completed in Allegheny, 80 in Delaware, 60 in Erie and 170 in Philadelphia. The outlets are randomly selected from the remaining outlets in each survey area. There were 131 supplemental sample issued in 2015.



Obtain a completion rate of 90 percent or better.

Pennsylvania had a 99.8 percent completion rate in 2015.



Record the actual steps of the survey process in the field, and keep records of all sources of sample attrition in the field.

Pennsylvania reported the actual steps of the survey process in the Annual Synar Report and kept all records.



Incorporate the complexity of the sample design as a factor when analyzing the survey results.

Pennsylvania used the Taylor series (linearization) method to estimate sampling errors of estimators based on complex sample designs. This method takes into account the variances among PSUs.



Weight the results of the Synar survey to account for unequal probabilities of selection, differences in percentages of eligible outlets between strata or clusters, and other deviations from the intended design.

A base weight is calculated for each outlet using the inverse of the probability of selection for each outlet divided by the total eligible outlets in the stratum (ELIGN). The base weight gives each sampled outlet a weight such that it sums to the number of eligible outlets in the state.

First, the probability of selection was calculated. In a complex design, such as this, the overall probability of selecting an outlet is the product of each stage's probability of selection.

(Probability of selecting a cluster) x (Probability of selecting an outlet within the cluster)

PROBCL = Probability of selecting a cluster

PROBOUT = Probability of selecting an outlet within the cluster

PROBST = Probability of selection for each outlet in the stratum

NCLUST = Number of clusters in the stratum

CPS = Cluster population size

ELIGN = Eligible stratum population size

SAMPSIZE = Sample size of the cluster

SAMPOBS = The number of completed and eligible sample per cluster

$$PROBCL = (NCLUST) \times \left(\frac{CPS}{ELIGN} \right)$$

$$PROBOUT = \left(\frac{SAMPSIZE}{CPS} \right)$$

$$PROBST = (PROBCL) \times (PROBOUT) =$$

$$= (NCLUST) \times \left(\frac{CPS}{ELIGN} \right) \times \left(\frac{SAMPSIZE}{CPS} \right) =$$

$$= (NCLUST) \times \left(\frac{SAMPSIZE}{ELIGN} \right)$$

The base weight (*BASEWGT*) is the inverse of the probability of selection.

$$BASEWGT = \frac{1}{(NCLIST)(SAMPSIZE)} \text{ or } \frac{(ELIGN)}{(NCLUST)(SAMPSIZE)}$$

$$(ELIGN)$$

The final weight adjusts the base weight for non-completion. The final weight gives each completed eligible outlet a weight such that it sums to the number of eligible outlets in the state. The final weight will always be greater than the base weight unless all sampled outlets are completed and eligible.

$$FINALWGT = BASEWGT \times \left(\frac{SAMPSIZE}{SAMPOBS} \right)$$



Meet Synar Regulation reporting requirements for the survey sampling methodology when completing the Annual Synar Report.

Pennsylvania met all methodology reporting requirements.

Survey Design

The population is defined as Pennsylvania outlets that sell cigarettes and are accessible to minors. The survey uses a sampling frame created from the Department of Revenue's Cigarette License File, which contains the name and address of every outlet that purchased a license to sell cigarettes in the state.

The survey employs a stratified and clustered design (**Figure 1**) where every eligible outlet location on the sampling frame is grouped into 10 mutually exclusive and exhaustive geographical strata consisting of the Northcentral Health District (NC), Northeast Health District (NE), Northwest Health District (NW), Southcentral Health District (SC), Southeast Health District (SE), Southwest Health District (SW), Allegheny (AL), Delaware (DE), Erie (ER) and Philadelphia (PH).

The outlets within the six "District" strata (NC, NE, NW, SC, SE and SW) are grouped into geographic clusters of adjacent zip codes. Clusters are selected using probability proportional to size sampling and a predetermined number of outlets within the cluster are selected. The outlets within the four "random" strata (AL, DE, ER and PH) are not clustered but are selected using a simple random selection process.

Survey Procedures

The survey is the result of the combined effort of four different state bureaus, private contractors and youth from across the state. Survey teams consisting of adult supervisors and youth between the ages of 15 and 17 are provided with a list of sampled outlets to visit. The youth enter the outlets, attempt to purchase cigarettes and record the outcome of the attempts. The survey was conducted from July 20, 2015, to Sept. 8, 2015.

Outlet Definitions (2015)

Bar/tavern – The primary purpose of a bar or tavern is to sell alcoholic beverages for on-site consumption. Some bars or taverns provide snacks or entire meals, and some don't.

Beer distributor – A beer distributor sells beer by the case. It may provide either walk-in or drive-thru service or both. It does not allow on-site consumption, and it may also sell other items such as soda or snacks.

Convenience – gas – This is a store selling a limited variety of food and an assortment of convenience items for the house and vehicle. It is part of a regional or national chain of stores and has multiple outlets in Pennsylvania. The store is usually open long hours for the convenience of customers. Some stores have a self-service microwave oven for heating purchased food. It sells gasoline and over-the-counter drugs or provides take-out foods, but its major sales items are food. Here is a list of the more popular outlets that should be placed in this category: 7-Eleven, AmPm, A-Plus, Circle K, Cogo’s, Convenient Food Marts, Crossroads, E-Z mart, GetGo, Git N Go, Go-Mart, Kwik Fill, QuickStop, Rutters, Sheetz, Stop-N-Go, Stuckey’s, Town and Country Food Stores, Turkey Hill, Uni-Mart, Wawa.

Convenience – no gas – This is a store that sells a limited variety of food and an assortment of convenience items for the house and vehicle but is independently owned; it does not belong to a regional or national chain. These outlets are sometimes referred to as country stores, corner stores, general stores, local markets, mini markets, convenience stores, grocery stores or “Mom and Pop” establishments. These outlets may or may not be open for long hours. Outdoor produce markets are included in this category.

Pharmacy/drug store – Drug stores sell prescription and over-the-counter medications. They may be part of a national or regional chain of outlets or owned and operated by an independent pharmacist. They may sell other items, but their major image is as a pharmacy.

News outlet – News outlets sell newspapers and magazines. They usually sell other items like candy, but their main purpose is selling newspapers and magazines. Include outdoor newsstands in this category.

Restaurant/deli – The primary purpose of an eat-in restaurant is the preparation and service of food for on-site consumption. It may offer alcoholic beverages and meals for take-out, but its major focus is food service for on-site consumption. Diners are included in this category. This kind of shop sells cooked or prepared foods ready for consumption such as cheeses, cold cooked meats, sandwiches and salads. Most delicatessens have a sandwich menu, most of which are made to order behind the counter at the time of sale. In addition to made-to-order sandwiches, many delicatessens offer made-to-order green salads. Equally common is a selection of pre-made pasta, potato, chicken, tuna, shrimp or other variety of salads. Delicatessens also offer a variety of beverages, chips and snacks. Take-out establishments offer prepared foods primarily for consumption off the premises. Some may not offer entire meals. Examples include pizza/sub shops, Chinese take-out, bagel shops and donut/coffee shops.

Supermarket – Supermarkets sell food and household items in a large facility. It is a departmentalized self-service store offering a wide variety of food and household merchandise. It is larger in size and has a wider selection than a traditional grocery store. The supermarket typically has meat, produce, dairy and baked goods departments. Along with the items for sale in the various departments, additional items for sale may include canned and packaged goods, as well as various nonfood items, such as household cleaners, pharmacy products and pet supplies. This category will include the major chains such as ACME, Food Lion, Giant, Giant Eagle, Karns, Save-A-Lot, Shop 'n Save and Weis.

Tobacco – The tobacco category covers all tobacco outlets, cigarette outlets and cigar shops. These outlets sell tobacco (cigarettes, cigars and/or smokeless tobacco) as their main product.

EMP-LOT-PVR-UNL – This category is used for empty or boarded up buildings, empty or vacant lots, private residences or clubs, and other addresses that are not locatable.

Other – This is a last-resort category. Use this category for locations that do not fit in any of the above categories. Describe the type of outlet in the space provided next to the “other” category. Category examples include check cashing outlets, laundromats, hotels, motels, record outlets, clothing outlets, book stores, hardware stores, video stores, campgrounds, prisons, bowling lanes (not in the bar), fire halls, The Gateway Clipper (boat), train stations, auto auctions, auto repair or service stations, bait shops, car dealerships, etc.

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