

# Comparing Rural and Urban Drug Use and Violence in the Pennsylvania Youth Survey

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July 2018



*The Center for*

**Rural Pennsylvania**

*A Legislative Agency of the Pennsylvania General Assembly*



This project was sponsored by a grant from the Center for Rural Pennsylvania, a legislative agency of the Pennsylvania General Assembly.

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## **Executive Summary**

In 2016, Pennsylvania ranked 5<sup>th</sup> in the nation for drug overdose deaths, and the overdose death rate increased 44.1 percent from 2015 to 2016, according to the Centers for Disease Control and Prevention (CDC). CDC data also indicate that Pennsylvania has a higher-than-average death rate due to gun violence, with about 12 firearm deaths for every 100,000 residents.

Understanding youth drug use and violent behavior is an important step in reducing drug use and violence in Pennsylvania. At the same time, rural and urban areas may have different rates of drug use and violence and thus require different types of interventions.

This study examined whether there are urban and rural differences in youth substance use (alcohol, tobacco, illicit drugs) and violent behavior in Pennsylvania. Using data from the 2011, 2013, and 2015 Pennsylvania Youth Surveys (PAYS), which are administered by the Pennsylvania Commission on Crime and Delinquency, the research analyzed substance use rates and instances of violent threats and behavior among 6<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup> and 12<sup>th</sup> grade students over time in urban and rural areas. The research also analyzed risk and protective factors associated with rural substance use and violence and the impact of school-based intervention/prevention programs on rates of substance use and violence for rural youth.

## **Results**

In terms of alcohol and illicit drug use, the results indicated little overall differences between urban and rural students. The only meaningful difference was among rural and urban 12<sup>th</sup> graders in rates of lifetime and past 30 day marijuana use, where urban students showed higher use rates than rural students. For example, 42.2 percent of urban 12th grade students reported lifetime marijuana use, compared to 34.7 percent of rural students. In addition, 24.0 percent of urban students in the 12<sup>th</sup> grade reported using marijuana in the past 30 days compared to 16.3 percent of rural students in the 12<sup>th</sup> grade.

It was in the use of tobacco products where the most significant difference between rural and urban students became apparent.

Rural students showed higher lifetime use of cigarettes and smokeless tobacco products than their urban counterparts. However, both groups used electronic vapor products at a similar rate. Urban students report higher disapproval of smoking among their peers, indicating that rural youth view using tobacco products as more acceptable than urban youth.

Since a large proportion of rural students are using tobacco products, the research indicates the need for programming at early grades to discourage smoking and the use of other tobacco products.

The substantial use of electronic vapor products should also be of major concern.

It appears that this new method of tobacco use is extremely popular among both urban and rural students, as 14.9 percent of urban students and 17.0 percent of rural students reported using electronic vapor products in the 30 days prior to the survey.

One possibility is that these products are viewed as safer than cigarettes so more students are willing to try them.

However, these products are still addictive substances and there is a need for anti-vaping programming to occur in early grade levels.

On the measures of violent behavior, victimization, and being threatened with violence, the analysis found no overall differences between urban and rural students.

Rural and urban students also did not demonstrate meaningful differences on risk scores for various family, school, and peer-related characteristics.

Analysis of how these characteristics impacted rural student substance use and violence revealed that established risk factors related to family life, school performance, and peer relations that have been associated with drug use and delinquency also have a negative impact on rural youth. Students who were found to be at risk in these areas showed higher levels of substance use and violent behavior/victimization at school.

Peer-related factors were the strongest predictors of substance use and violent behavior.

Finally, prevention services in rural schools did not appear to be related to changes in substance use and violence rates in schools.

Between 2013 and 2015, there were small reductions in overall substance use and violence in rural schools, on average. These reductions were not attributable to prevention programs that occurred in the school district in the 2014/15 school year.

However, this analysis only examined the number of prevention programs in a school district and the data did not include details about individual programs operating in schools. Further research could examine the rural schools that had the biggest reductions in substance use between 2013 and 2015 and attempt to get more school-specific details about the programs that operated in those schools.

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## **Introduction**

In 2016, Pennsylvania ranked 5<sup>th</sup> in the nation for drug overdose deaths, and the overdose death rate increased 44.1 percent from 2015 to 2016, according to the Centers for Disease Control and Prevention (CDC). CDC data also indicate that Pennsylvania has a higher-than-average death rate due to gun violence, with about 12 firearm deaths for every 100,000 residents.

Understanding youth drug use and violent behavior is an important step in reducing drug use and violence in Pennsylvania. At the same time, rural and urban areas may have different rates of drug use and violence and thus require different types of interventions.

This study examined whether there are urban and rural differences in youth substance use (alcohol, tobacco, illicit drugs) and violent behavior in Pennsylvania. Using data from the 2011, 2013, and 2015 Pennsylvania Youth Survey (PAYS), which is administered by the Pennsylvania Commission on Crime and Delinquency, the researcher examined substance use rates and instances of violent threats and behavior over time for urban and rural areas. The research also analyzed risk and protective factors associated with rural substance use and violence and the impact of school-based intervention/prevention programs on rates of substance use and violence for rural youth.

### *Review of Related Research*

Previous research has shown that urban and rural youth have different rates of alcohol, tobacco, and illicit drug use. While some research has found that overall illicit drug use is similar between urban and rural youth (Cronk and Sarvela, 1997; Donnermeyer, 1992), other research shows that urban youth use marijuana at higher rates than rural youth (Dawkins, 2001; Jiang, 2016). More recent research also shows that rural youth drink alcohol and smoke cigarettes more often than urban youth (Atav and Spencer, 2002; Dawkins, 2001; Lambert et al., 2008; Pruitt, 2008; Thomas, 1993). National data from the early 2000s also found that rural youth used methamphetamine at a higher rate than urban youth (Lambert et al., 2008). Several studies have also found higher rates of nonprescription drug use among rural youth compared to their urban counterparts (Havens et al., 2011; Keyes et al., 2014).

Further research that compares drug use between urban and rural youth is needed to demonstrate whether there are differences by substances. In addition, with the recent increased misuse of prescription drugs nationally, we do not yet know whether rural youth in Pennsylvania use these drugs at a different rate than their urban counterparts. Because misusing prescription drugs can lead to more serious drug use, like heroin, it is important to identify the areas where youth are using these substances at higher rates. Drug use has also been linked to increased morbidity and mortality rates (Cronk and Sarvela, 1997). Identifying the need for rural substance abuse treatment programs is important because rural areas typically lack access to the treatment services necessary for positive outcomes (Pullen and Oser, 2014).

Early research studies have found significant differences in the rates of delinquency and violence between urban and rural youth, with urban areas showing higher crime, violence, and delinquency rates (Lentz, 1956). Official statistics and numerous sociological studies over time have confirmed these differences in delinquency and violence between urban and rural areas (Devoe et al., 2004; Elgar et al., 2003; Lyerly and Skipper, 1981; Osgood and Chambers, 2003). Still, other research questions a direct relationship between school violence and the location of school (urban vs. rural). For instance, using 2003 national data, Wynne and Joo (2011) found that there were no significant differences in victimization rates between urban and rural schools after controlling for other individual and family characteristics.

One possible explanation for a difference is stronger ties to school, family, and community in rural areas (Lyerly and Skipper, 1981; Osgood and Chambers, 2003). Such strong ties serve as protective factors in rural areas, reducing the likelihood of delinquent behavior. Witnessing school violence has been linked to experiences of trauma and other types of violence (Flannery et al., 2004).

Similarly, research has found several risk and protective factors associated with drug use among rural youth. For instance, peer drug use is strongly correlated with a rural youth's own experimentation with drugs (Sarvela and McClendon, 1988). Common protective factors that may contribute to lower drug use among rural youth include attachment to parents, school, and the community (Park et al., 2016). These risk and protective factors, however, may operate differently for rural youth depending on their

location. For instance, one study found that high school students living on farms were exposed to a greater number of risk factors than students living in small towns (Rhew et al., 2011).

## **Goals and Objectives**

The goals of the research were to determine which risk and protective factors are linked to rural students' drug use and violence, and how those factors might differ across rural areas.

To achieve these goals, the research included the following four objectives.

- Analyze student behavior, attitudes and knowledge concerning alcohol, tobacco, and other drugs and violence in rural and urban Pennsylvania schools from the 2015 PAYS.
- Compare student risk behaviors over the past three surveys to determine overall trends.
- Identify risk and protective factors related to alcohol use, tobacco use, drug use and violence in rural Pennsylvania schools from the 2015 PAYS.
- Analyze how school intervention programs in rural schools have impacted alcohol/drug use and violence over time.

## **Methodology**

*Objective 1. Analyze student behavior, attitudes and knowledge concerning alcohol, tobacco, and other drugs and violence in rural and urban Pennsylvania schools from the 2015 PAYS.*

The Pennsylvania Youth Survey (PAYS) is a survey administered to Pennsylvania students in the 6<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> grades every 2 years by the Pennsylvania Commission on Crime and Delinquency.

The anonymous survey asks questions about the student's alcohol use, illicit drug use, tobacco use, family life, relationships with peers, connections to school and the community, experiences of violence, both as a victim and a perpetrator, along with demographic variables. More details about the sampling methodology of the PAYS, participating schools, and the survey instrument itself can be found at [http://www.pccd.pa.gov/Juvenile-Justice/Pages/Pennsylvania-Youth-Survey-\(PAYS\)-2017.aspx](http://www.pccd.pa.gov/Juvenile-Justice/Pages/Pennsylvania-Youth-Survey-(PAYS)-2017.aspx).

For the 2015 PAYS, a total of 216,746 students were included in this analysis. An additional 530 students completed at least part of the survey, but their school was either not listed or they attended a cyber school, so they were excluded from the analysis. Of the 216,746 students, about 69 percent attended an urban school and 31 percent attended a rural school, as determined by the Center for Rural Pennsylvania's definition of rural and urban school districts. There were 960 schools that participated in the survey. At least one school in 62 out of 67 total counties participated in the 2015 survey. The number of students participating represents a response rate of 70.4 percent, and students were evenly represented across the state. All types of schools participated in the survey, including public, private, charter, and online. Notably, no schools participated from Sullivan, Union, Wayne, or Wyoming counties. While several schools in Allegheny County participated, none participated from the Pittsburgh School District. In addition, the number of students participating from Philadelphia is small compared to the size of the city's student population. For these reasons, the PAYS data likely includes more rural students than their proportion of the Pennsylvania population (estimated to be about 27 percent by the Center for Rural Pennsylvania). While this is helpful for gathering data about rural students specifically, comparisons between rural and urban students may be deficient, especially considering the low participation of the two largest urban areas in the state.

To complete Objective 1, the researcher analyzed data from the 2015 PAYS, including "lifetime" use and "past 30 day" use of alcohol, tobacco products, and illicit substances. Lifetime use measures whether the student *ever* used the substance, while past 30 day use measures a student's use in the month prior to the survey. In addition to actual alcohol and drug use, data were analyzed measuring how acceptable students found alcohol, tobacco, and drug use and how much disapproval their peers had of substance use. The variables measuring the student's experiences with violence included how often in the past 12 months they had been threatened at school, attacked by someone, brought a weapon to school, attacked someone else, or intentionally hurt themselves. Using the Center for Rural Pennsylvania's definition of rural and urban school districts, the researcher coded each student's school as urban or rural. A school was labeled rural if it was in a county or school district with fewer than 284 persons per square

mile. A school was designated “urban” if it was located in a county with 284 or more persons per square mile.

The researcher analyzed data for the whole sample and then by grade level. In addition, the researcher looked at the demographic variables of race, ethnicity, gender, and household structure to elaborate on the urban/rural differences found.

*Objective 2. Comparison of student risk behaviors over the past three surveys to determine overall trends.*

To accomplish this objective, the researcher analyzed data from the two previous PAYS (2011, 2013) and compared them to the 2015 data. The 2013 PAYS was administered to 200,622 youth in grades 6, 8, 10 and 12 during the fall of 2013 (69.5 percent participation rate across the state). There were 891 schools that chose to participate in the 2013 PAYS; about 61 percent of the sample were in urban schools and 39 percent were in rural schools. The 2011 PAYS included 141,088 students (61.8 percent participation rate), about 64 percent of whom were located in urban schools and 36 percent in rural schools.

*Objective 3. Identification of risk and protective factors related to alcohol use, tobacco use, drug use and violence in rural Pennsylvania schools from the 2015 PAYS.*

Researchers who develop and analyze the PAYS have created several scales from the survey to measure whether a student is at low risk or high risk based on their responses to questions about family life, school, and peers. Four family-related scales, two school-related scales, and two peer-related scales were included to identify risk and protective factors that were associated with alcohol use, tobacco use, drug use, and violence for rural students. These scales were analyzed with the same substance use and violence variables described in Objective 1.

*Objective 4. Analysis of how school intervention programs in rural schools have impacted alcohol/drug use and violence over time.*

The Pennsylvania Commission on Crime and Delinquency, in coordination with the Department of Drug and Alcohol Programs, provided the researcher with a list of the number of drug and alcohol prevention programs and services were offered by each school district in the 2014/15 school year. However, the data could not be broken down to the school level. Therefore, the researcher used the number of services in a school district as a proxy for the prevention programs and services offered in a given school. This method likely overstates the number of programs for each school because the school's number is based on the number in the district. However, this was the only way to analyze the data to measure the impact of programs on school rates of drug use and violence. In addition, the type of program was not listed, so the number of programs could also include those for parents or members of the community that occurred at the school.

Data from the 2013 and 2015 PAYS were aggregated to the school level to assess the mean amount of substance use and violence in that school. A variable was created to measure how much change there was in the average amount of substance use and violence in each school. These data were then correlated with the number of prevention programs at a school to see if there was a relationship between the number of programs and changes in substance use and violence over time.

## **RESULTS**

### **Objective 1. Analysis of student behavior, attitudes, and knowledge concerning alcohol, tobacco, and other drugs and violence in rural and urban PA schools (2015 PAYS).**

The PAYS asks many questions regarding the student's use of alcohol, tobacco products, and illicit drugs (or using a non-illicit substance for the purpose of getting high). The PAYS also asks questions to measure a student's attitudes toward alcohol and drugs, such as their approval of peer use, and several questions about whether the student has experienced violence, either as a victim or as a perpetrator, or has been threatened with violence. The researcher analyzed the 2015 PAYS data to

determine if there were meaningful differences between urban and rural students on the various measures of substance use, attitudes and knowledge about alcohol/drugs, and violence. Because of the large sample size, almost any difference between groups was found to be statistically significant. However, for the purposes of this research, differences of less than 5 percent between groups were determined to not be meaningful, even if they were statistically significant.<sup>1</sup>

### Rural and Urban Student Use of Alcohol, Tobacco, and Other Drugs

Table 1 compares urban and rural students on lifetime use of alcohol and 14 different illicit drugs. “Illicit” drugs refer to illegal substances as well as legal substances that are used in a non-approved way (i.e., the abuse of prescription medication, sniffing glue, taking over-the-counter medicines to get high, etc). For the substances where at least 5 percent of the sample reported any lifetime use, the categories were recoded into 0 occasions (no lifetime use), 1-2 occasions, and 3 or more occasions. For substances where more than 95.0 percent of the sample reported no use during their lifetime, two categories were created: 0 occasions (no lifetime use) and 1 or more occasions. Because of the large sample size, almost any percentage point difference between urban and rural students was found to be statistically significant. That is, the chi-square test of significance includes sample size as part of its calculation, so almost any difference between groups gets noted as statistically significant even if the difference is not meaningful. Variables are flagged as significant at the .05 level (\*), the .01 level (\*\*), and the .001 level (\*\*\*) but it should not be concluded that a statistically significant difference is a meaningful difference between groups. It just means that a difference would be expected in the population, however small.

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<sup>1</sup> Data analysts typically consider a difference of at least 5 percentage points to be worthy of discussion. Anything smaller than that is not considered meaningful. Many analysts don’t consider differences of under 10 percentage points to be that meaningful. For the purposes of this report, differences of at least 5 percentage points are reported as possibly meaningful.

**Table 1. Lifetime Alcohol and Drug Use by Urban/Rural School, All Grades (number of students in parentheses)**

		<b>Urban</b>	<b>Rural</b>
<b>Alcohol***</b>	0 occasions	58.0% (85709)	55.0% (36782)
	1-2 occasions	15.8% (23414)	16.4% (10964)
	3 or more occasions	26.2% (38609)	28.6% (19112)
<b>Marijuana***</b>	0 occasions	82.7% (121342)	84.5% (56172)
	1-2 occasions	4.4% (6464)	4.6% (3055)
	3 or more occasions	12.9% (18858)	10.9% (7279)
<b>Glue/Aerosol***</b>	0 occasions	95.7% (140955)	94.9% (63419)
	1-2 occasions	2.6% (3838)	2.9% (1950)
	3 or more occasions	1.7% (2496)	2.2% (1460)
<b>Cocaine**</b>	0 occasions	98.8% (145801)	98.6% (66001)
	1 or more occasions	1.2% (1785)	1.4% (909)
<b>Crack**</b>	0 occasions	99.6% (146624)	99.5% (66455)
	1 or more occasions	0.4% (661)	0.5% (359)
<b>Heroin*</b>	0 occasions	99.6% (146523)	99.5% (66425)
	1 or more occasions	0.4% (630)	0.5% (335)
<b>Hallucinogens**</b>	0 occasions	97.4% (142770)	97.2% (64688)
	1 or more occasions	2.6% (3808)	2.8% (1885)
<b>Methamphetamine**</b>	0 occasions	99.5% (145842)	99.4% (66226)
	1 or more occasions	0.5% (683)	0.6% (368)
<b>Ecstasy*</b>	0 occasions	98.1% (142908)	98.0% (64786)
	1 or more occasions	1.9% (2714)	2.0% (1332)

<b>Performance Enhancing Drugs***</b>	0 occasions	99.1% (146044)	98.8% (66039)
	1 or more occasions	0.9% (1306)	1.2% (787)
<b>Prescription Pain***</b>	0 occasions	94.2% (138255)	93.4% (62221)
	1-2 occasions	2.8% (4103)	3.4% (2254)
	3 or more occasions	3.0% (4373)	3.2% (2151)
<b>Prescription Tranquilizers</b>	0 occasions	97.8% (143255)	97.9% (65136)
	1 or more occasions	2.2% (3238)	2.1% (1397)
<b>Prescription Stimulants</b>	0 occasions	96.5% (140828)	96.5% (64007)
	1 or more occasions	3.5% (5177)	3.5% (2306)
<b>Synthetic Drugs***</b>	0 occasions	97.6% (142266)	97.2% (64404)
	1 or more occasions	2.4% (3536)	2.8% (1856)
<b>Over the Counter Medicine</b>	0 occasions	96.3% (140778)	96.3% (64001)
	1 or more occasions	3.7% (5430)	3.7% (2472)

\*p < .05, \*\*p < .01, \*\*\*p < .001 Source: 2015 Pennsylvania Youth Survey (PAYS).

Table 1 reveals that there are no meaningful differences between urban and rural students for lifetime alcohol or drug use. The largest difference was in alcohol use with 45.0 percent of rural students reporting any lifetime use compared to 42.0 percent of urban students. Such a small difference (3 percentage points), however, is not considered meaningful. Rural and urban students had even smaller differences in lifetime marijuana use (1.8 percentage points) and virtually no differences in using any other illicit substance. Overall, a very small percentage of both urban and rural students reported any illicit drug use.

**Table 2. Alcohol and Drug Use in the Past 30 Days by Urban/Rural School, All Grades  
(number of students in parentheses)**

		<b>Urban</b>	<b>Rural</b>
<b>Alcohol***</b>	None	82.4% (120883)	81.5% (54315)
	1 or 2 times	10.6% (155588)	11.2% (7497)
	3 or more times	7.0% (10204)	7.3% (4835)
<b>Marijuana***</b>	None	90.3% (131154)	92.3% (61059)
	1 or 2 times	3.8% (5552)	3.1% (2062)
	3 or more times	5.9% (8526)	4.6% (3032)
<b>Glue/Aerosol***</b>	None	98.8% (143878)	98.6% (65429)
	1 or more times	1.2% (1730)	1.4% (950)
<b>Cocaine</b>	None	99.7% (145027)	99.6% (66093)
	1 or more times	0.3% (453)	0.4% (235)
<b>Crack</b>	None	99.9% (145047)	99.9% (66185)
	1 or more times	0.1% (205)	0.1% (95)
<b>Heroin</b>	None	99.9% (144918)	99.9% (66122)
	1 or more times	0.1% (185)	0.1% (97)
<b>Hallucinogens</b>	None	99.4% (143792)	99.3% (65571)
	1 or more times	0.6% (890)	0.7% (440)
<b>Methamphetamine**</b>	None	99.9% (144369)	99.8% (65893)
	1 or more times	0.1% (191)	0.2% (119)
<b>Ecstasy</b>	None	99.5% (143203)	99.5% (65378)
	1 or more times	0.5% (674)	0.5% (340)
<b>Performance Enhancing</b>	None	99.7% (144821)	99.6% (66033)

<b>Drugs*</b>	1 or more times	0.3% (442)	0.4% (247)
<b>Prescription Pain***</b>	None	98.2% (142332)	97.9% (64796)
	1 or more times	1.8% (2580)	2.1% (1382)
<b>Prescription Tranquilizers</b>	None	99.3% (143688)	99.4% (65652)
	1 or more times	0.7% (1006)	0.6% (416)
<b>Prescription Stimulants</b>	None	98.9% (142807)	98.8% (65216)
	1 or more times	1.1% (1658)	1.2% (759)
<b>Synthetic Drugs*</b>	None	99.4% (143571)	99.3% (65526)
	1 or more times	0.6% (849)	0.7% (437)
<b>Over the Counter Medicine</b>	None	98.7% (142908)	98.6% (65239)
	1 or more times	1.3% (1904)	1.4% (926)

\*p < .05, \*\*p < .01, \*\*\*p < .001 Source: 2015 Pennsylvania Youth Survey (PAYS).

Table 2 compares urban and rural students on alcohol and illicit drug use during the past 30 days. Similar to the findings regarding lifetime use, there were no meaningful differences between urban and rural students on past 30 day use of alcohol or any illicit drugs. There was also no meaningful urban/rural difference in the amount of alcohol consumed in the past two weeks (not shown in table).

To identify any possible differences by grade level, data regarding lifetime and past 30 day alcohol and illicit drug use were broken down by the various grade levels in which the survey was administered – 6<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup>. For alcohol and most other substances, grade level did not reveal any meaningful urban/rural differences. One interesting difference emerged for marijuana use for lifetime and past 30 day use. While there were no urban/rural differences among 6<sup>th</sup>, 8<sup>th</sup>, or 10<sup>th</sup> grade students on marijuana use, there was a meaningful difference between urban and rural students in the 12<sup>th</sup> grade. Urban 12<sup>th</sup> graders reported higher lifetime and past 30 day use of marijuana than rural 12<sup>th</sup> graders. Overall, 42.2 percent of urban students reported lifetime marijuana use in the 12<sup>th</sup> grade, compared to 34.7 percent of rural students. In addition, 16.3 percent of rural students in the 12<sup>th</sup> grade reported using

marijuana in the past 30 days compared to 24.0 percent of urban students in the 12<sup>th</sup> grade. Furthermore, urban students in the 12<sup>th</sup> grade also reported a higher frequency of use, with 15.6 percent indicating that they used marijuana three or more times in the past 30 days, compared to 10.5 percent of rural 12<sup>th</sup> grade students reporting marijuana use of that frequency.

Tables 3 and 4 examine tobacco use among urban and rural students. The PAYS measured tobacco use by asking students to report any lifetime use and past 30 days use of cigarettes or smokeless tobacco (i.e., chewing tobacco). They also asked students to report past 30 day use of electronic vapor products (i.e., vaporizers, vaping, e-cigarettes). As Table 3 shows, there were no meaningful differences between urban and rural students on past 30 day tobacco use but there were meaningful differences on lifetime use of cigarettes and smokeless tobacco.

**Table 3. Tobacco Use by Urban/Rural School, All Grades (number of students in parentheses)**

		<b>Urban</b>	<b>Rural</b>
<b>Cigarettes</b>	Past 30 days (any use)***	5.1% (139441)	8.5% (61026)
	Lifetime use***	13.7% (127061)	20.1% (53443)
<b>Smokeless tobacco</b>	Past 30 days (any use)***	2.5% (143019)	6.6% (62217)
	Lifetime use***	5.7% (138572)	13.5% (57728)
<b>Electronic vapor product</b>	Past 30 days (any use)***	14.9% (124665)	17.0% (55287)
	Lifetime use	--	--

\*p < .05, \*\*p < .01, \*\*\*p < .001 Source: 2015 Pennsylvania Youth Survey (PAYS).

Rural students overall reported higher lifetime use than their urban counterparts. Rural students, however, only had slightly higher past 30 day use of cigarettes and smokeless tobacco, suggesting that while more rural youth try these substances at some point, similar rates of urban and rural youth end up using them regularly.

Results were broken down by grade level (6<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup>) to see if any patterns emerged that were noteworthy or different from the overall summary. For smoking cigarettes in the past 30 days, some

noteworthy urban/rural differences emerged in the 10<sup>th</sup> grade and grew even larger in the 12<sup>th</sup> grade (see Table 4). Interestingly, the urban/rural difference for lifetime cigarette use becomes meaningful at the 8<sup>th</sup> grade level (rural youth had 5.0 percent higher use than their urban counterparts) indicating that rural youth appear to start experimenting with cigarettes at a younger age. For past 30 day use of smokeless tobacco, notable differences (greater than 5.0 percentage points) also do not emerge until the 10<sup>th</sup> grade but it's worth noting that the percentage of rural youth who used smokeless tobacco in the past 30 days jumped from 0.7 percent among 6<sup>th</sup> graders to 4.0 percent among 8<sup>th</sup> graders (compared to 0.9 percent of urban 8<sup>th</sup> graders).

**Table 4. Tobacco Use by Urban/Rural School, 10<sup>th</sup> and 12<sup>th</sup> Grades (number of students in parentheses)**

		<b>Urban</b>	<b>Rural</b>
<b>Cigarettes</b>	Past 30 days (any use)***	9.1% (62437)	14.3% (27701)
	Lifetime use***	22.5% (53273)	31.5% (22174)
<b>Smokeless tobacco</b>	Past 30 days (any use)***	4.6% (65360)	11.1% (28712)
	Lifetime use***	10.3% (61626)	21.3% (25426)
<b>Electronic vapor product</b>	Past 30 days (any use)***	23.8% (52226)	26.7% (23693)
	Lifetime use	--	--

\*p < .05, \*\*p < .01, \*\*\*p < .001 Source: 2015 Pennsylvania Youth Survey (PAYS).

Overall, both urban and rural students are using electronic vapor products at a high rate; 26.7 percent of rural 10<sup>th</sup> or 12<sup>th</sup> grade students and 23.8 percent of urban 10<sup>th</sup> or 12<sup>th</sup> grade students reported using an electronic vapor product in the past 30 days. There are no meaningful differences between urban and rural students in using electronic vapor products; both groups are using these products at a much higher rate than cigarettes and smokeless tobacco.

For the tobacco use variables that showed at least a 5 percentage point urban/rural difference, the control variables sex, race/ethnicity, and family structure were added to the analysis (see Table 5). These variables were chosen because they have been shown to be related to youth tobacco use in previous

research. Among all racial/ethnic groups, rural students showed higher lifetime cigarette use than their urban counterparts. Asian/Pacific Islander students overall showed the lowest rates of lifetime cigarette use. There was no difference between males and females in lifetime smoking rates for either urban or rural students. There was an effect of family structure, with students living in a household with both a mother and father having lower lifetime smoking rates than those living in other household structures. Rural students not living with both their mother and father showed the highest rate of lifetime cigarette use (28.9 percent).

For lifetime smokeless tobacco use, males had much higher rates of use than females. In fact, controlling for sex resulted in a larger urban/rural difference for males. Only 9.1 percent of urban males reported ever using smokeless tobacco, compared to 20.5 percent of rural males. Race showed a similar effect as cigarette use. All racial/ethnic groups showed higher rates of use among rural students compared to their urban counterparts. Among rural students, whites, African Americans, American Indians, and Hispanic/Latinos had similar lifetime smokeless tobacco use rates, while rural Asian students had a much lower rate. There was also an effect of family structure, with rural students not living with both their mother and father having a higher rate of smokeless tobacco use (17.1 percent) than rural students living with their mother and father (11.2 percent).

**Table 5. Tobacco Use by Urban/Rural School, Controlling for Demographic Variables**

		<b>Urban</b>	<b>Rural</b>
Lifetime Cigarette Use (all grades)	Male	13.7% (9903)	19.9% (6542)
	Female	13.7% (9840)	20.0% (6492)
	White	14.5% (15551)	20.8% (12275)
	Black	15.8% (3339)	23.1% (658)

	Hispanic/Latino	15.5% (3308)	20.9% (787)
	Asian/Pacific Islander	9.4% (1055)	15.3% (225)
	American Indian/Alaska Native	18.1% (950)	22.1% (584)
	Living with mother and father	9.8% (9136)	14.5% (5981)
	Other family structure	20.7% (11091)	28.9% (7359)
Lifetime Use of Smokeless Tobacco (all grades)	Male	9.1% (6535)	20.5% (6700)
	Female	2.3% (1637)	6.4% (2094)
	White	6.9% (7339)	14.3% (8421)
	Black	3.2% (675)	12.1% (344)
	Hispanic/Latino	3.5% (748)	10.9% (411)
	Asian/Pacific Islander	2.8% (312)	8.1% (118)
	American Indian/Alaska Native	5.5% (286)	14.0% (369)
	Living with mother and father	5.1% (4736)	11.2% (4626)
	Other family structure	6.7% (3612)	17.1% (4364)
Past 30 Day Cigarette Use (10 <sup>th</sup> and 12 <sup>th</sup> Graders)	Male	9.4% (3149)	14.4% (2274)
	Female	8.6% (2915)	14.1% (2245)

	White	9.9% (5299)	14.6% (4361)
	Black	7.6% (698)	12.3% (180)
	Hispanic/Latino	9.0% (754)	13.2% (244)
	Asian/Pacific Islander	4.9% (256)	10.3% (71)
	American Indian/Alaska Native	11.8% (237)	17.2% (155)
	Living with mother and father	6.5% (2814)	10.3% (2011)
	Other family structure	13.5% (3404)	20.2% (2602)
Past 30 day Smokeless Tobacco Use (10 <sup>th</sup> and 12 <sup>th</sup> Graders)	Male	8.1% (2699)	19.4% (3057)
	Female	1.3% (424)	2.9% (459)
	White	5.4% (2876)	11.4% (3417)
	Black	2.5% (229)	8.2% (120)
	Hispanic/Latino	3.0% (253)	8.3% (153)
	Asian/Pacific Islander	2.0% (103)	6.1% (42)
	American Indian/Alaska Native	4.8% (95)	12.8% (115)
	Living with mother and father	4.4% (1886)	9.7% (1892)
	Other family structure	5.1% (1296)	13.2% (1697)

Source: 2015 Pennsylvania Youth Survey (PAYS).

For past 30 day cigarette use, there was no meaningful gender difference for rural or urban students. American Indian/Alaska Native students showed the highest rate of use among urban and rural students. There was also an interaction effect for family structure and urban/rural school; rural students not living with their mother and father had the highest rate of past 30 day cigarette use (20.2 percent). Past 30 day smokeless tobacco use showed similar results as lifetime smokeless tobacco use regarding gender and race differences. Family structure also impacted results, although not as strongly as it did for lifetime smokeless tobacco use.

Student Attitudes and Knowledge of Alcohol, Tobacco, and Other Drugs

This section examined the student’s assessment of how easy it would be to obtain illicit substances, their willingness to try various substances, and their feelings about how wrong it would be to use alcohol, tobacco, and other drugs.

Table 6 examined if there were urban/rural differences in how easy the student thought it would be to obtain various substances. As can be seen in the table, urban and rural students

**Table 6. Ease of Obtaining Various Substances by Urban/Rural School (number of students in parentheses)**

		<b>Urban</b>	<b>Rural</b>
<b>Prescription Drugs***</b>	Very/Sort of Hard	73.4% (99870)	73.7% (46164)
	Very/Sort of Easy	26.6% (36100)	26.3% (16412)
<b>Alcohol*</b>	Very/Sort of Hard	56.6% (73061)	56.6% (34328)
	Very/Sort of Easy	43.3% (55966)	43.4% (26314)
<b>Cigarettes***</b>	Very/Sort of Hard	67.6% (87110)	63.9% (38687)

	Very/Sort of Easy	32.4% (41719)	36.1% (21873)
<b>Marijuana***</b>	Very/Sort of Hard	68.3% (87659)	71.6% (43155)
	Very/Sort of Easy	31.7% (40570)	28.4% (17177)
<b>Other Illicit Drug**</b>	Very/Sort of Hard	89.3% (114842)	89.6% (54150)
	Very/Sort of Easy	10.7% (13677)	10.5% (6309)

\*p < .05, \*\*p < .01, \*\*\*p < .001 Source: 2015 Pennsylvania Youth Survey (PAYS).

reported that it would be very or sort of easy to obtain prescription drugs, alcohol, cigarettes, marijuana, and other illicit drugs at about the same rate. When the data were broken down by grade level (not shown in table), there were still no urban/rural differences in ease of obtaining prescription drugs, alcohol, cigarettes, or other illicit drugs. Overall, the ease of obtaining these substances increased dramatically by the 12<sup>th</sup> grade for all students. However, there was a meaningful and statistically significant urban/rural difference for 10<sup>th</sup> and 12<sup>th</sup> graders in ease of obtaining marijuana as 43.9 percent of urban 10<sup>th</sup> graders indicated obtaining marijuana was “very” or “sort of” easy compared to 38.5 percent of rural 10<sup>th</sup> graders (a difference of 5.4 percent). The difference grew for 12<sup>th</sup> graders, where 64.0 percent of urban students indicated obtaining marijuana was very or sort of easy, compared to 56.1 percent of rural 12<sup>th</sup> graders (a difference of 7.9 percent). This finding is not very surprising considering the higher use of marijuana among urban students in the 12<sup>th</sup> grade.

Table 7 shows how willing a student would be to try alcohol or marijuana before age 21. There were no meaningful differences between urban and rural students; rural students were only slightly more likely (1.3 percent) to say they would like to try alcohol than urban students and slightly less likely (2.2 percent) to want to try marijuana. Controlling for grade level (not shown in table), there were no urban/rural differences for willingness to try alcohol. A meaningful difference between urban and rural

12<sup>th</sup> graders emerged for wanting to try marijuana. More urban 12<sup>th</sup> graders reported wanting to use marijuana (33.6 percent) than their rural counterparts (24.9 percent).

**Table 7. Willingness to Try Alcohol and Marijuana Before Age 21 by Urban/Rural School (number of students in parentheses)**

		<b>Urban</b>	<b>Rural</b>
<b>Alcohol***</b>	Never/Probably Not	57.1% (82705)	54.7% (36110)
	Not Sure	17.3% (25114)	18.4% (12139)
	Would Like To/Definitely	25.5% (36954)	26.8% (17714)
<b>Marijuana***</b>	Never/Probably Not	76.7% (110945)	79.6% (52520)
	Not Sure	8.5% (12296)	7.8% (5153)
	Would Like To/Definitely	14.8% (8278)	12.6% (8278)

\*p < .05, \*\*p < .01, \*\*\*p < .001 Source: 2015 Pennsylvania Youth Survey (PAYS).

Table 8 examined the level of disapproval the student had for their peers' use of various substances. There were no meaningful differences between urban and rural students for disapproval of peer substance use on any of the measures. Overall, disapproval rates were lowest for marijuana use compared to alcohol, cigarettes and prescription drugs. This could be that students see daily use of alcohol and cigarettes as more dangerous than periodic use of marijuana. When the data were broken down by grade level (not shown in table), the only meaningful urban/rural differences to emerge were among 12<sup>th</sup> graders for disapproving of a peer smoking every day or using marijuana monthly or more. Rural 12<sup>th</sup> graders showed lower disapproval for smoking than their urban counterparts (77.2 percent vs. 82.6 percent) but higher disapproval for marijuana use than urban 12<sup>th</sup> graders (51.9 percent vs. 41.7 percent).

**Table 8. Level of Disapproval for Peer Use of Substances by Urban/Rural School (number of students in parentheses)**

		<b>Urban</b>	<b>Rural</b>
<b>Peer Using Alcohol Every Day***</b>	Disapprove	74.3% (107349)	70.9% (46712)
	Neither Approve or Disapprove	16.0% (23090)	18.7% (12300)
	Approve	2.7% (3928)	3.7% (2457)
<b>Peer Smoking 1-2 Packs of Cigarettes a Day***</b>	Disapprove	88.6% (127960)	86.2% (56856)
	Neither Approve or Disapprove	6.5% (9353)	8.5% (5588)
	Approve	0.7% (1045)	1.3% (835)
<b>Peer Using Marijuana Once a Month or More***</b>	Disapprove	69.6% (100053)	72.9% (47945)
	Neither Approve or Disapprove	16.3% (23438)	14.9% (6123)
	Approve	9.1% (13053)	7.7% (5036)
<b>Peer Using Prescription Drugs Not Prescribed to Them***</b>	Disapprove	85.9% (123068)	86.6% (56669)
	Neither Approve or Disapprove	8.2% (11700)	8.2% (5378)
	Approve	0.8% (1123)	0.8% (543)

\*p < .05, \*\*p < .01, \*\*\*p < .001 Source: 2015 Pennsylvania Youth Survey (PAYS).

Table 9 shows how wrong the students' friends would think it would be for them to use alcohol, tobacco, marijuana, or prescription drugs. A similar percentage of urban and rural students perceived that their friends would think it was wrong to use alcohol, marijuana, or prescription drugs (no differences between urban and rural students of at least 5.0 percent). There was a difference between urban and rural students on how wrong their friends would view tobacco use. More urban students (81.6 percent) said their friends would find tobacco use wrong or very wrong compared to rural students (74.4 percent).

When the data in Table 9 were broken down by grade level, no meaningful differences between urban and rural students emerged for friends' disapproval of prescription drug use. Interesting differences emerged among 10<sup>th</sup> and 12<sup>th</sup> graders concerning alcohol and tobacco use. More urban students expressed

that their friends would disapprove of daily alcohol and tobacco use than rural students and these differences got larger from 10<sup>th</sup> to 12<sup>th</sup> grades. For example, 67.1 percent of urban 10<sup>th</sup> graders reported that their friends would think their using alcohol every day was wrong or very wrong compared to 60.6 percent or rural 10<sup>th</sup> graders. Disapproval dropped to 58.2 percent of urban 12<sup>th</sup> graders and 50.7 percent of rural 12<sup>th</sup> graders.

**Table 9. Level of Disapproval by Friends for Substance Use by Urban/Rural School  
(number of students in parentheses)**

		<b>Urban</b>	<b>Rural</b>
<b>Using Alcohol Every Day***</b>	Wrong/Very Wrong	75.2% (99383)	70.3% (43435)
	A Little Bit Wrong	14.7% (19372)	12.4% (10775)
	Not Wrong at All	10.1% (13397)	12.3% (7608)
<b>Using Tobacco***</b>	Wrong/Very Wrong	81.6% (107651)	74.4% (45974)
	A Little Bit Wrong	9.2% (12078)	11.7% (7216)
	Not Wrong at All	9.2% (12194)	13.8% (8551)
<b>Using Marijuana***</b>	Wrong/Very Wrong	70.6% (92689)	73.2% (45099)
	A Little Bit Wrong	12.1% (15904)	11.6% (7130)
	Not Wrong at All	17.3% (22791)	15.2% (9333)
<b>Using Prescription Drugs Not Prescribed to You</b>	Wrong/Very Wrong	86.7% (114119)	86.8% (53472)
	A Little Bit Wrong	7.0% (9193)	6.8% (4190)
	Not Wrong at All	6.3% (8287)	6.3% (3898)

\*p < .05, \*\*p < .01, \*\*\*p < .001 Source: 2015 Pennsylvania Youth Survey (PAYS).

There was a similar pattern for friends' disapproval of tobacco use, with rural students feeling lower disapproval from their friends. Specifically, 77.6 percent of urban 10<sup>th</sup> graders and 67.7 percent of rural 10<sup>th</sup> graders reported that their friends would feel it was wrong or very wrong for them to use

tobacco. For 12<sup>th</sup> graders, 66.1 percent of urban students felt peer disapproval compared to 53.9 percent of rural students. Rural 12<sup>th</sup> graders felt higher disapproval from their friends for marijuana use; 51.7 percent of rural students indicated their friends would find it wrong for them to use marijuana compared to 42.9 percent of urban 12<sup>th</sup> graders. These results are consistent with the other results, suggesting that rural students disapprove of marijuana use more so than their urban counterparts but that urban students have higher disapproval of tobacco use than rural students.

**Table 10. Violent Behavior by Urban/Rural School (number of students in parentheses)**

		<b>Urban</b>	<b>Rural</b>
<b>Brought a weapon to School (lifetime)***</b>	Never	95.4% (97323)	93.8% (45485)
	1-2 times	3.3% (3413)	4.4% (2142)
	3 or more times	1.3%(1320)	1.3% (617)
<b>Brought a weapon to school (last 30 days)***</b>	Never	98.8% (100513)	98.5% (47637)
	1-2 times	0.6% (613)	0.8% (372)
	3 or more times	0.6% (471)	0.8% (364)
<b>Attacked someone (past 12 months)</b>	Never	93.9% (958030)	94.1% (45594)
	1-2 times	4.4% (4506)	4.2% (2057)
	3 or more times	1.7% (1684)	1.7% (807)
<b>Harmed self (past 12 months)***</b>	Never	85.7% (86710)	84.7% (40721)
	1-2 times	6.7% (6785)	6.9% (3312)
	3 or more times	7.6% (7639)	8.4% (4064)
<b>Ever belonged to a Gang*</b>	Yes	4.9% (6401)	5.1% (3151)

\*p < .05, \*\*p < .01, \*\*\*p < .001 Source: 2015 Pennsylvania Youth Survey (PAYS).

Violent Behavior, Victimization, and Attitudes

Table 10 shows how often a student engaged in various violent behaviors. There were no meaningful differences on any of the measures between urban and rural students. Overall, a small

percentage of each group engaged in any violent behavior. Only about 4.9 percent of the total sample reported having belonged to a gang and there were no meaningful differences between urban and rural students. 8.0 percent of students overall indicated that they had 1 or more friends involved in a gang, with no meaningful urban/rural differences. When controlling for grade level (not shown in table), no urban/rural differences emerged.

**Table 11. Victimization at School in Past 12 Months by Urban/Rural School (number of students in parentheses)**

		<b>Urban</b>	<b>Rural</b>
<b>Been Threatened to be Hit or Beaten Up***</b>	Never	80.7% (83253)	77.4% (37776)
	Once	9.9% (10163)	10.9% (5322)
	More than Once	9.4% (9716)	11.8% (5735)
<b>Been Attacked or Beaten Up***</b>	Never	91.9% (94599)	91.2% (44483)
	Once	5.1% (5271)	5.4% (2619)
	More than Once	3.0% (3062)	3.4% (1674)
<b>Been Threatened with a Weapon**</b>	Never	96.1% (98747)	95.7% (46632)
	Once	2.5% (2542)	2.7% (1308)
	More than Once	1.4% (1452)	1.6% (792)
<b>Been Attacked with a Weapon</b>	Never	98.6% (100956)	98.6% (47869)
	Once	0.7% (750)	0.7% (364)
	More than Once	0.7% (693)	0.7% (332)

\*p < .05, \*\*p < .01, \*\*\*p < .001 Source: 2015 Pennsylvania Youth Survey (PAYS).

Similarly, Table 11 shows no urban/rural differences for students being threatened or attacked (victimized) at school during the past 12 months. When controlling for grade level, one urban/rural difference emerged. Slightly more rural 10<sup>th</sup> grade students were threatened at school than their urban

counterparts (18.0 percent of urban 10<sup>th</sup> graders reported at least one threat in the past 12 months compared to 23.2 percent of rural 10<sup>th</sup> graders) although no other grade level showed an urban/rural difference and there were no urban/rural differences by grade level in any other measure of victimization.

**Table 12. Student Attitudes toward Violence by Urban/Rural School (number of students in parentheses)**

		<b>Urban</b>	<b>Rural</b>
<b>Take Handgun to School***</b>	Very wrong/wrong	96.3% (3554)	96.3% (1529)
	A little bit wrong	1.0% (1382)	1.2% (762)
	Not at all Wrong	2.7% (127873)	2.5% (59377)
<b>Pick a Fight***</b>	Very wrong/wrong	78.6% (7305)	77.1% (3667)
	A little bit wrong	15.9% (21050)	17.0% (10443)
	Not at all Wrong	5.5% (104101)	6.0% (47438)
<b>Attack Someone to Hurt Them***</b>	Very wrong/wrong	92.1% (4444)	91.3% (2043)
	A little bit wrong	4.6% (6068)	5.4% (3299)
	Not at all Wrong	3.4% (122109)	3.3% (56273)

\*p < .05, \*\*p < .01, \*\*\*p < .001 Source: 2015 Pennsylvania Youth Survey (PAYS).

Table 12 assesses how wrong students think it is to engage in violence. As the table shows, there were no urban/rural differences in attitudes about taking a handgun to school, picking a fight, or attacking someone. No urban/rural differences emerged, either, when controlling for grade level. It is worth noting, however, that a sizeable percentage of both groups of students (more than 20 percent of each group) did not think it was very wrong to pick a fight with someone.

## **Objective 2. Comparison of Student Risk Behaviors Over Past Three PAYS to Determine Overall Trends (2011, 2013, 2015)**

### Alcohol and Illicit Drugs

In 2011 and 2013, there were no meaningful urban/rural differences for any lifetime alcohol or other drug use, similar to what was found in 2015. While many showed a statistically significant difference, this is likely just due to a large sample size. No differences between urban and rural students were at least 5 percentage points on any lifetime alcohol or drug use. There were also no meaningful differences for use in the past 30 days of alcohol or any other drugs for either 2011 or 2013.

Comparing the three surveys on alcohol and drug use, there was also no meaningful increase or decrease in lifetime use of these substances over the three surveys. That is, students were using all substances in 2015 at almost the exact same rate as they were in 2011 and 2013. The only substance showing something close to a meaningful change (but still not at least 5.0 percent) was inhalants (sniffing glue, aerosol cans, etc), as 10.0 percent of rural students in 2011 reported lifetime use of inhalants compared to 6.7 percent of rural students in 2013 and 5.1 percent of rural students in 2015. Urban students also showed a slight drop in the use of inhalants, from 8.5 percent reporting lifetime use in 2011 compared to 4.3 percent indicating any lifetime use in 2015. Comparing past 30 day use between 2011, 2013, and 2015 revealed no meaningful changes in the percentage of urban or rural students using each substance.

### Tobacco Use

Table 13 shows tobacco use by urban and rural students over time. Only the 2015 survey asked about electronic vapor products so it was not possible to compare use of these types of tobacco products over time. As the table shows, there were no meaningful urban/rural differences in past 30 day use of cigarettes in 2011 or 2013 and the overall percentage of students using cigarettes in the past 30 days did not change very much. Lifetime cigarette use did show a meaningful decline for rural students over time. While 26.2 percent of rural students in 2011 indicated lifetime cigarette use, that percentage dropped to

20.1 percent in 2015. Urban students also saw about a 5.0 percent decline in lifetime cigarette use between 2011 and 2015. Rural students also saw a small decline in lifetime use of smokeless tobacco product (3.8 percent less in 2015 compared to 2011); urban students saw a smaller decline but much less use overall compared to rural students.

Both the 2011 and 2013 PA Youth Surveys also asked questions regarding attitudes and knowledge that the student had toward alcohol, tobacco, and illicit drugs. However, the wording of the questions was slightly different in the 2011 survey compared to the other two years, making comparisons problematic for these variables.

**Table 13. Tobacco Use by Urban/Rural School, All Grades**

		2011		2013		2015	
		Urban	Rural	Urban	Rural	Urban	Rural
<b>Cigarettes</b>	Past 30 days	7.2%	10.9%	6.9%	8.9%	5.1%	8.5%
	(any use)	(6266)	(5272)	(8287)	(6956)	(7497)	(5670)
	Lifetime use	18.8%	26.2%	15.3%	18.8%	13.7%	20.1%
		(15812)	(12268)	(18418)	(14766)	(20227)	(13340)
<b>Smokeless tobacco</b>	Past 30 days	3.5%	9.2%	3.1%	6.4%	2.5%	6.6%
	(any use)	(2939)	(4319)	(3751)	(5001)	(3679)	(4432)
	Lifetime use	7.1%	17.3%	6.3%	12.3%	5.7%	13.5%
		(5930)	(8115)	(7645)	(9666)	(8348)	(8990)

Source: 2011, 2013, and 2015 Pennsylvania Youth Surveys (PAYS).

### **Objective 3. Identification of Risk and Protective Factors Related to Alcohol Use, Tobacco Use, Drug Use, and Violence in Rural PA Schools (2015 PAYS)**

In this section, risk and protective factors are examined that could influence alcohol, drug, and tobacco use, as well as violent behavior, among rural students only. Researchers for the PAYS created several scales to assess various risk and protective factors that could influence substance use and other problematic behavior. For each scale, researchers identified a “cut-off point” to determine students at risk who are above the norm for each item. This norm level came from 11 statewide surveys across the country, conducted in 2010-11, for students in grades 6, 8, 10 and 12. The cut-points were used to calculate the percentages of youth at risk or with protection on the various questions asked in the 2015 PAYS. As the PAYS researchers explain, “A cut-point helps to define the level of responses that are at or above a standard/normal level of risk, or conversely at or below a standard/normal level of protection. Rather than randomly determining whether a youth may be at risk or protected, a statistical analysis is completed that helps to determine at what point on any particular scale that the risk or protective factor is outside the normal range” (2015 PAYS State Report). In this way, the percentage represents the population of youth who are either at greater risk or lower protection than the national cut-point level. Cut points also provide a standard for comparisons of risk and protection over time.

This section first compares urban and rural students on these scales to determine if one group was more “at risk” than the other (that is, were more likely to be above the cut-point). Then, the scales used to identify possible risk and protective factors associated with substance use, attitudes toward using substances, and violent behavior are analyzed among rural youth only.

#### **Family Risk and Protective Factors**

Students responded to about 30 questions regarding their family life, family members’ behaviors, and their relationship with their parents and siblings. These questions were used to construct the scales presented in Table 14. The “Poor Family Management” scale includes lack of clear expectations for behavior, failure of parents to monitor their children (knowing where they are and who they are with), and

excessively severe or inconsistent punishment. The “High Family Conflict” scale indicates serious conflict between primary care givers or between care givers and children. These types of family dynamics have been linked to increased risk of substance use and violence in past studies, much more so than family structure alone.

The “Family Antisocial Behavior Scale” measures items such as parents’ attitudes toward fighting, while the “Parental Attitudes Favor Drug Use” measures items about how acceptable the student’s parents view drug and alcohol use. In families where parents display violent behavior toward those outside or inside the family, there is an increase in the risk that a child will become violent. Similarly, parental approval of moderate drinking, even under parental supervision, substantially increases the likelihood of the young person using alcohol.

As Table 14 shows, rural and urban students had similar scores on the various risk and protective factor scales associated with family life. No difference is at least 5 percentage points. The largest difference between urban and rural students is on the scale measuring parental attitudes toward drug use; rural students, on average, have slightly higher risk scores indicating their parents have more favorable attitudes toward drug use. Still, that difference is only 2.5 percentage points so it should not be interpreted as a meaningful difference.

**Table 14. Percentage of Urban and Rural Students Determined to be High Risk on Family-Related Characteristics**

	<b>Urban</b>	<b>Rural</b>
Poor Family Management Scale***	36.6% (49408)	35.6% (22437)
High Family Conflict Scale	34.6% (46156)	34.7% (21637)
Family Antisocial Behavior Scale***	32.4% (42904)	34.1% (21226)
Parental Attitudes Favor Drug Use***	29.9% (39486)	32.4% (20133)

\*p < .05, \*\*p < .01, \*\*\*p < .001 Source: 2015 Pennsylvania Youth Survey (PAYS).

Tables 15 and 16 show how various family characteristics could impact rural students' use of alcohol, tobacco, marijuana, inhalants, and prescription pain drugs. Any substance that had at least 5.0 percent of rural students indicating lifetime or past 30 day use was included in the analysis. Not surprisingly, rural students who scored high risk on any of the family-related scales were much more likely to use alcohol, marijuana, inhalants, and prescription pain medications than rural students who scored low risk on these measures.

**Table 15. Percentage of Rural Students Using Alcohol or Selected Drugs in their Lifetime by Risk Cut-Off for Family Characteristics (number of students in parentheses)\***

		<b>Low Risk</b>	<b>High Risk</b>
<b>Alcohol</b>	Poor Family Management Scale	37.0% (40395)	61.3% (22226)
	High Family Conflict Scale	39.7% (40521)	57.4% (21493)
	Family Antisocial Behavior Scale	36.7% (40721)	63.4% (21092)
	Parental Attitudes Favor Drug Use	32.4% (41754)	74.1% (19966)
<b>Marijuana</b>	Poor Family Management Scale	10.1% (40207)	26.2% (22112)
	High Family Conflict Scale	12.3% (40346)	22.6% (21367)
	Family Antisocial Behavior Scale	8.5% (10546)	30.0% (20975)
	Parental Attitudes Favor Drug Use	7.3% (41539)	33.8% (19908)
<b>Inhalants</b>	Poor Family Management Scale	2.7% (40395)	9.4% (22225)
	High Family Conflict Scale	3.1% (40539)	8.8% (21474)
	Family Antisocial Behavior Scale	2.7% (40743)	9.8% (21080)
	Parental Attitudes Favor Drug Use	2.6% (41744)	10.2% (20004)
<b>Prescription Pain</b>	Poor Family Management Scale	3.4% (40291)	12.6% (22187)
	High Family Conflict Scale	4.4% (10438)	11.1% (21444)
	Family Antisocial Behavior Scale	3.1% (10636)	13.6% (21053)
	Parental Attitudes Favor Drug Use	3.1% (41597)	14.3% (20005)

\*All X<sup>2</sup> results were significant at the p < .001 level. Source: 2015 Pennsylvania Youth Survey (PAYS).

**Table 16. Percentage of Rural Students Using Alcohol or Marijuana in the Past 30 Days by Risk Cut-Off for Family Characteristics (number of students in parentheses)\***

		<b>Low Risk</b>	<b>High Risk</b>
<b>Alcohol</b>	Poor Family Management Scale	12.6% (40314)	30.1% (22172)
	High Family Conflict Scale	15.4% (40444)	25.5% (21433)
	Family Antisocial Behavior Scale	12.8% (40669)	30.8% (21026)
	Parental Attitudes Favor Drug Use	9.7% (41663)	38.3% (19934)
<b>Marijuana</b>	Poor Family Management Scale	4.2% (40058)	14.3% (22001)
	High Family Conflict Scale	5.8% (40168)	11.7% (21294)
	Family Antisocial Behavior Scale	3.2% (40395)	16.7% (20891)
	Parental Attitudes Favor Drug Use	2.8% (41371)	18.3% (19833)

\*All X<sup>2</sup> results were significant at the p<.001 level. Source: 2015 Pennsylvania Youth Survey (PAYS).

Rural students who were high risk for parents favoring drug use showed the highest alcohol and drug use, both lifetime and past 30 day use.

Rural students scoring high risk on any of the various family-related scales also showed higher use of tobacco products (Table 17). The differences were larger for lifetime cigarette use, past 30 day cigarette use, and past 30 day use of electronic vapor products than for smokeless tobacco use, indicating that risk factors associated with family life have a larger impact on cigarette and electronic vapor use than on smokeless tobacco use.

**Table 17. Use of Tobacco Products among Rural Students by Risk Cut-off for Family**

**Characteristics (number of students in parentheses)\***

		<b>Low Risk</b>	<b>High Risk</b>
<b>Lifetime Cigarettes</b>	Poor Family Management Scale	10.3% (125988)	25.8% (71597)
	High Family Conflict Scale	11.9% (125799)	23.8% (61681)
	Family Antisocial Behavior Scale	8.8% (130139)	30.6% (63884)
	Parental Attitudes Favor Drug Use	8.1% (134319)	34.0% (59436)
<b>Past 30 day Cigarette</b>	Poor Family Management Scale	3.5% (125792)	11.0% (71492)
	High Family Conflict Scale	4.4% (127391)	9.9% (67603)
	Family Antisocial Behavior Scale	2.8% (129947)	12.4% (63803)
	Parental Attitudes Favor Drug Use	2.3% (134109)	15.4% (59367)
<b>Lifetime Smokeless Tobacco</b>	Poor Family Management Scale	5.8% (125825)	12.5% (71488)
	High Family Conflict Scale	7.4% (127423)	10.0% (67596)
	Family Antisocial Behavior Scale	5.3% (129967)	14.4% (63810)
	Parental Attitudes Favor Drug Use	6.1% (134137)	17.7% (59368)
<b>Past 30 day smokeless tobacco</b>	Poor Family Management Scale	2.6% (125705)	6.0% (71414)
	High Family Conflict Scale	3.5% (127300)	4.5% (67539)
	Family Antisocial Behavior Scale	2.4% (129876)	6.8% (63752)
	Parental Attitudes Favor Drug Use	1.7% (134027)	8.8% (59309)
<b>Past 30 day Electronic Vapor</b>	Poor Family Management Scale	12.7% (125634)	24.9% (71358)
	High Family Conflict Scale	12.7% (127251)	21.8% (67494)
	Family Antisocial Behavior Scale	9.5% (129771)	28.8% (63721)
	Parental Attitudes Favor Drug Use	8.7% (133906)	32.1% (59301)

\*All X<sup>2</sup> results were significant at the p<.001 level. Source: 2015 Pennsylvania Youth Survey (PAYS).

**Table 18. Percentage of Rural Students Experiencing Violence by Risk Cut-Off for Family Characteristics (number of students in parentheses)\***

		<b>Low Risk</b>	<b>High Risk</b>
<b>Been Threatened at School Past 12 Months</b>	Poor Family Management Scale	16.3% (96008)	27.3% (53703)
	High Family Conflict Scale	14.9% (96569)	30.5% (51559)
	Family Antisocial Behavior Scale	14.6% (99245)	31.6% (49548)
	Parental Attitudes Favor Drug Use	17.6% (103707)	26.5% (45537)
<b>Been Attacked at School Past 12 Months</b>	Poor Family Management Scale	6.2% (95892)	11.9% (53597)
	High Family Conflict Scale	5.6% (96854)	13.2% (51445)
	Family Antisocial Behavior Scale	5.6% (99167)	13.6% (49457)
	Parental Attitudes Favor Drug Use	7.0% (103604)	11.2% (45461)
<b>Been Threatened with Weapon at School Past 12 Months</b>	Poor Family Management Scale	2.7% (95772)	6.4% (53512)
	High Family Conflict Scale	2.6% (96707)	6.7% (51388)
	Family Antisocial Behavior Scale	2.2% (99058)	7.5% (49372)
	Parental Attitudes Favor Drug Use	2.9% (103441)	6.6% (45435)
<b>Been Attacked with Weapon at School Past 12 Months</b>	Poor Family Management Scale	0.7% (95496)	2.6% (53298)
	High Family Conflict Scale	0.9% (96389)	2.4% (51223)
	Family Antisocial Behavior Scale	0.6% (98769)	2.9% (49176)
	Parental Attitudes Favor Drug Use	0.8% (103132)	2.7% (45269)
<b>Ever Brought a Weapon to School</b>	Poor Family Management Scale	2.9% (95296)	9.2% (53127)
	High Family Conflict Scale	3.6% (96181)	8.1% (51054)
	Family Antisocial Behavior Scale	3.0% (98522)	9.4% (49018)
	Parental Attitudes Favor Drug Use	3.0% (102856)	10.1% (45130)
<b>Brought Weapon to School</b>	Poor Family Management Scale	0.6% (95077)	2.7% (52960)
	High Family Conflict Scale	0.9% (95949)	2.2% (50916)

<b>School Past 30 Days</b>	Family Antisocial Behavior Scale	0.6% (89347)	2.7% (48859)
	Parental Attitudes Favor Drug Use	0.5% (102618)	3.1% (45005)
<b>Attacked Someone Past 12 Months</b>	Poor Family Management Scale	3.2% (95281)	11.7% (53070)
	High Family Conflict Scale	3.4% (96158)	10.9% (51045)
	Family Antisocial Behavior Scale	2.8% (98534)	12.4% (48989)
	Parental Attitudes Favor Drug Use	3.6% (102841)	11.4% (45132)
<b>Harmed Self Past 12 Months</b>	Poor Family Management Scale	10.2% (94647)	22.6% (52551)
	High Family Conflict Scale	8.4% (95561)	26.6% (50564)
	Family Antisocial Behavior Scale	9.6% (97861)	24.9% (48535)
	Parental Attitudes Favor Drug Use	10.9% (102047)	23.2% (44779)

\*All X<sup>2</sup> results were significant at the p<.001 level. Source: 2015 Pennsylvania Youth Survey (PAYS).

Table 18 examines how the family-related factors can influence whether the student experiences violence or threats of violence at school. Rural students at high risk based on the various family scales report higher levels of being threatened or attacked at school but the differences are not at least 5 percentage points for being threatened or attacked with a weapon at school. For the violence measures, it appears that the family-related risk factor most associated with being threatened or attacked at school is the family antisocial behavior scale. This is not very surprising because it indicates that rural students living with family members who fight with others or have more permissive attitudes about fighting are more likely to engage in conflict with others at school.

Rural students who scored higher risk on the family-related scales also were more likely to have ever brought a weapon to school, although there was not a meaningful difference by risk level for those bringing a weapon in the past 30 days. There were meaningful differences by risk level for attacking someone in the past 12 months, with rural students having high risk for family antisocial behavior having the highest rate of attacking someone. Most dramatic, rural students scoring high risk on the family-related scales were much more likely than low risk students to have harmed themselves in the past 12 months. Students living in families with high conflict were the most likely to have hurt themselves.

### School and Peer-Related Risk and Protective Factors

Several scales were used to investigate the role of school and peer-related risk factors on a student's alcohol use, tobacco use, drug use, and engagement with violence or threats of violence. At the school level, scales measured if the student was at risk for low school commitment and academic failure. Prior research shows that young people who have lost their commitment to school are at higher risk for problem behaviors, such as substance use and violence. At the peer level, scales measured the extent that a student engaged with antisocial peers and peers who used drugs.

Table 19 reports whether there were urban/rural differences on risk level for the school and peer-related scales. All of the urban/rural differences were statistically significant at the  $p < .001$  level, indicating a difference in the population. However, the percentage of urban and rural students who scored high risk on the various scales was quite similar. No difference was at least 5 percentage points across groups.

**Table 19. Percentage of Urban and Rural Students Determined to be High Risk on School and Peer-Related Factors**

	<b>Urban</b>	<b>Rural</b>
School Academic Failure Scale***	33.5% (43111)	34.7% (20920)
Low School Commitment Scale***	40.7% (55210)	43.5% (27334)
Peer's Drug Use Scale***	26.0% (33964)	26.9% (16384)
Interaction with Antisocial Peers***	25.4% (33247)	23.1% (14084)

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$  Source: 2015 Pennsylvania Youth Survey (PAYS).

Table 20 examines lifetime alcohol, marijuana, inhalant, and prescription drug use by the rural student's risk level for the school and peer-related risk factors. As can be seen in the table, rural students who were at high risk for the various school and peer-level factors exhibited much higher alcohol and

drug use than rural students deemed to be low risk. Most dramatically, rural students at high risk of engaging with peers who use drugs were the most likely to have used alcohol and marijuana in their lifetime. Rural students at high risk for engaging with antisocial peers also used these substances at a very high rate. Peer-related risk factors appear to be a more serious risk factor for alcohol and drug use than school-related factors. A similar pattern can be seen in Table 21 with past 30 day use of alcohol and marijuana.

**Table 20. Percentage of Rural Students Using Alcohol or Selected Drugs in their Lifetime by Risk Cut-Off for School and Peer-Related Factors\***

		<b>Low Risk</b>	<b>High Risk</b>
<b>Alcohol</b>	School Academic Failure Scale	42.0% (16487)	54.1% (11236)
	Low School Commitment Scale	35.6% (12568)	58.7% (15922)
	Peer's Drug Use Scale	34.4% (15193)	77.5% (12629)
	Interaction with Antisocial Peers	39.9% (18630)	66.2% (9272)
<b>Marijuana</b>	School Academic Failure Scale	11.8% (4619)	23.8% (4913)
	Low School Commitment Scale	9.4% (3293)	24.1% (6497)
	Peer's Drug Use Scale	7.0% (3077)	40.1% (6508)
	Interaction with Antisocial Peers	9.9% (4584)	36.2% (5029)
<b>Inhalants</b>	School Academic Failure Scale	3.5% (1389)	8.1% (1674)
	Low School Commitment Scale	2.5% (882)	8.5% (2294)
	Peer's Drug Use Scale	2.6% (1135)	11.8% (1921)

	Interaction with Antisocial Peers	3.1% (1437)	11.7% (1635)
<b>Prescription Pain</b>	School Academic Failure Scale	4.8% (1895)	10.3% (2134)
	Low School Commitment Scale	3.4% (1188)	10.8% (2939)
	Peer's Drug Use Scale	3.1% (1351)	16.5% (2697)
	Interaction with Antisocial Peers	3.7% (1735)	16.6% (2327)

\*All X<sup>2</sup> results were significant at the p < .001 level. Source: 2015 Pennsylvania Youth Survey (PAYS).

**Table 21. Percentage of Rural Students Using Alcohol or Marijuana in the Past 30 Days by Risk Cut-Off for School and Peer-Related Factors\***

		<b>Low Risk</b>	<b>High Risk</b>
<b>Alcohol</b>	School Academic Failure Scale	16.1% (6294)	24.9% (5154)
	Low School Commitment Scale	12.1% (4268)	27.5% (7442)
	Peer's Drug Use Scale	10.3% (4563)	42.2% (6848)
	Interaction with Antisocial Peers	14.2% (6623)	34.6% (4821)
<b>Marijuana</b>	School Academic Failure Scale	5.3% (2048)	12.8% (2627)
	Low School Commitment Scale	4.0% (1406)	12.6% (3396)
	Peer's Drug Use Scale	2.1% (922)	23.4% (3776)
	Interaction with Antisocial Peers	3.7% (1724)	21.6% (2988)

\*All X<sup>2</sup> results were significant at the p<.001 level. Source: 2015 Pennsylvania Youth Survey (PAYS).

Table 22 analyzes tobacco use, both lifetime and past 30 day, by rural student risk level on the school and peer-related risk factor scales. Rural students at high risk on all of the scales were much more likely to use tobacco products than rural students at lower risk. Similar to the findings for alcohol and drug use, the factor most influential in tobacco use was associating with peers who use drugs.

**Table 22. Use of Tobacco Products among Rural Students by Risk Cut-off for School and Peer-Related Factors\***

		<b>Low Risk</b>	<b>High Risk</b>
<b>Lifetime Cigarettes</b>	School Academic Failure Scale	14.1% (5550)	32.1% (6671)
	Low School Commitment Scale	11.9% (4199)	30.9% (8411)
	Peer's Drug Use Scale	10.3% (4575)	47.5% (7738)
	Interaction with Antisocial Peers	13.7% (6390)	42.7% (5969)
<b>Past 30 day Cigarette</b>	School Academic Failure Scale	5.0% (1971)	15.4% (3209)
	Low School Commitment Scale	4.0% (1422)	14.4% (3922)
	Peer's Drug Use Scale	2.9% (1275)	24.0% (3916)
	Interaction with Antisocial Peers	4.5% (2088)	22.3% (3123)
<b>Lifetime Smokeless Tobacco</b>	School Academic Failure Scale	9.5% (3746)	21.3% (4439)
	Low School Commitment Scale	8.0% (2846)	20.6% (5591)
	Peer's Drug Use Scale	7.5% (3307)	30.0% (4884)
	Interaction with Antisocial Peers	9.3% (4340)	27.8% (3880)
<b>Past 30 day smokeless tobacco</b>	School Academic Failure Scale	4.1% (1607)	11.6% (2404)
	Low School Commitment Scale	3.4% (1202)	10.8% (2933)
	Peer's Drug Use Scale	3.3% (1476)	15.6% (2537)
	Interaction with Antisocial Peers	4.2% (1941)	14.9% (2087)
<b>Past 30 day Electronic Vapor</b>	School Academic Failure Scale	13.0% (5102)	25.6% (5325)
	Low School Commitment Scale	10.4% (3688)	26.1% (7074)
	Peer's Drug Use Scale	9.6% (3810)	41.0% (6678)
	Interaction with Antisocial Peers	11.8% (5515)	35.9% (5012)

\*All X<sup>2</sup> results were significant at the p<.001 level. Source: 2015 Pennsylvania Youth Survey (PAYS).

**Table 23. Percentage of Rural Students Experiencing Violence by Risk Cut-Off for School and Peer-Related Factors\***

		<b>Low Risk</b>	<b>High Risk</b>
<b>Been Threatened at School Past 12 Months</b>	School Academic Failure Scale	18.6% (5531)	29.5% (4462)
	Low School Commitment Scale	16.7% (4418)	29.9% (5952)
	Peer's Drug Use Scale	17.7% (5905)	35.4% (4161)
	Interaction with Antisocial Peers	17.7% (6296)	39.2% (3808)
<b>Been Attacked at School Past 12 Months</b>	School Academic Failure Scale	6.6% (1957)	12.4% (1878)
	Low School Commitment Scale	5.9% (1550)	12.3% (2444)
	Peer's Drug Use Scale	6.7% (2229)	13.9% (1628)
	Interaction with Antisocial Peers	6.3% (2229)	16.9% (1643)
<b>Been Threatened with Weapon at School Past 12 Months</b>	School Academic Failure Scale	3.1% (918)	6.3% (957)
	Low School Commitment Scale	2.6% (680)	6.5% (1286)
	Peer's Drug Use Scale	2.8% (945)	8.1% (955)
	Interaction with Antisocial Peers	2.6% (918)	10.2% (991)
<b>Been Attacked with Weapon at School Past 12 Months</b>	School Academic Failure Scale	0.9% (265)	2.4% (358)
	Low School Commitment Scale	0.7% (175)	2.4% (480)
	Peer's Drug Use Scale	0.9% (284)	2.9% (340)
	Interaction with Antisocial Peers	0.7% (253)	3.8% (371)
<b>Ever Brought a Weapon to School</b>	School Academic Failure Scale	4.4% (1289)	9.9% (1490)
	Low School Commitment Scale	3.4% (886)	10.0% (1974)
	Peer's Drug Use Scale	4.0% (1327)	12.3% (1446)
	Interaction with Antisocial Peers	3.9% (1367)	14.7% (1417)
<b>Brought Weapon to School</b>	School Academic Failure Scale	0.9% (266)	2.7% (412)
	Low School Commitment Scale	0.6% (156)	2.7% (542)

<b>School Past 30 Days</b>	Peer's Drug Use Scale	0.8% (274)	3.4% (395)
	Interaction with Antisocial Peers	0.7% (248)	4.4% (422)
<b>Attacked Someone Past 12 Months</b>	School Academic Failure Scale	3.9% (1155)	9.6% (1450)
	Low School Commitment Scale	2.9% (763)	9.8% (1942)
	Peer's Drug Use Scale	3.2% (1056)	13.5% (1581)
	Interaction with Antisocial Peers	3.1% (1109)	15.9% (1540)
<b>Harmed Self Past 12 Months</b>	School Academic Failure Scale	12.5% (3680)	21.6% (3222)
	Low School Commitment Scale	9.8% (2565)	23.1% (4533)
	Peer's Drug Use Scale	10.4% (3434)	30.4% (3556)
	Interaction with Antisocial Peers	12.0% (4219)	29.0% (2793)

\*All X<sup>2</sup> results were significant at the p<.001 level. Source: 2015 Pennsylvania Youth Survey (PAYS).

The PAYS measures violent behavior, victimization, use of weapons, harming self, and being threatened with violence; the results are presented in Table 23. Being high risk on the school and peer-related risk factors are strongly related to some of the measures, including having brought a weapon to school, having been threatened or attacked at school, and having attacked someone else. The overall percentage of rural students who have brought a weapon to school in the past 30 days (1.6 percent) or have been attacked with a weapon in the past 12 months (1.4 percent) is quite small, which helps explain why the risk factors are not as strongly related to these measures, although rural students who are high risk are still more likely to engage in the behaviors than low risk rural students. Most concerning is the large percentage of rural students who are high risk on the various scales and have harmed themselves in the past 12 months. Similar to the tobacco use measures, rural students who are associating with peers who use drugs and exhibit antisocial characteristics are the most at risk for engaging in violence. For instance, 15.9 percent of rural students at high-risk for associating with antisocial peers have attacked someone in the past 12 months.

#### **Objective 4. Analysis of How School Prevention Programs in Rural Schools Have Impacted Alcohol/Drug Use and Violence Over Time**

To investigate how programming at rural schools could impact the use of alcohol, marijuana, and tobacco, on average, at that school, as well as school-level violence, the researcher aggregated the data to the school level. The researcher created mean scores for all students in that school for past 30 day use of alcohol, tobacco, and marijuana, as well as measures of violent behavior and being threatened during the past 12 months so that each school received one score for each measure. The mean score indicates, on average, how often students in that school were using the various substances or engaging in violence. For instance, a mean score of 2.0 would indicate that students in that school consumed alcohol 1-2 times in the past 30 days, on average.

To assess the level of programming regarding substance use, violence prevention, and other mental health services in schools, the researcher obtained data showing the number of such programs and services for each school district. In the dataset, each school was assigned the number of services available for that district. Services were anything that happened at a school, including services provided after school and those not provided to students at the school (e.g. a parent or community education program held in the evening at the school, meetings held at the school, etc.). While this is not the most accurate representation of programming at an individual school, it was the only level for which the data were available. The average number of programs in a rural district for the 2013-2014 academic year was 130.

To measure changes in average substance use and violent activity at that school, the researcher subtracted the 2013 mean scores from the 2015 mean scores to create an overall change score for each measure. The exact interpretation of these scores is difficult because the PAYS measures how often a student engaged in substance use or violence in ranges rather than in precise numbers. For instance, a score of “4” on the measure for past 30 day alcohol use indicates the student consumed alcohol on “6-9 occasions.” Therefore, the change scores are useful for displaying trends, such as if substance use has increased or decreased over time, on average, but the exact score change is not precise as it cannot be determined exactly how many occasions of drinking occurred, on average, in a given year. A total of 328

rural schools were used in this analysis; schools missing data about programming or the drug use and violence measures were excluded from analysis.

Table 24 shows the descriptive statistics for the 328 rural schools included in this analysis. For all measures except the student having been attacked with a weapon in the past 12 months, 2015 saw lower average use of alcohol, marijuana, tobacco and violence than 2013.

**Table 24. Descriptive Statistics of School-Level Average Change in Alcohol, Marijuana, Tobacco, and Violence, 2013 to 2015 (N=328)**

	Mean Change	Standard Deviation
Past 30 Day Alcohol Use	-.0324	.139
Past 30 Day Marijuana Use	-.0091	.137
Past 30 Day Cigarette Use	-.0318	.108
Past 30 Day Smokeless Tobacco Use	-.0151	.100
Past 12 Months Student Threatened	-.0192	.218
Past 12 Months Student Attacked	-.0043	.138
Past 12 Months Student Threatened with Weapon	-.0006	.077
Past 12 Months Student Attacked with Weapon	.0033	.051
Past 12 Months Student Attacked Someone	-.0344	.113

Source: 2013 and 2015 Pennsylvania Youth Surveys (PAYS).

Correlation analysis was used to determine if the number of programs in that school’s district impacted the average change in alcohol use, marijuana use, tobacco use, and violence in schools. Table 25 shows the correlation matrix for all of the change variables regarding alcohol, marijuana, and tobacco use in the past 30 days, with the number of services available in that school’s district. Table 26 shows the correlations for the measures of violence in schools with intervention programs.

**Table 25. Correlation Matrix of Alcohol, Tobacco, and Drug Use with Number of Programs in School**

	<b>Number of Programs</b>	<b>Alcohol Change</b>	<b>Marijuana Change</b>	<b>Cigarette Change</b>	<b>Smokeless Tobacco Change</b>
<b>Number of Programs</b>	1	.103	.057	.054	-.001
<b>Alcohol Change</b>	--	1	.481***	.450***	.350***
<b>Marijuana Change</b>	--	--	1	.478***	.273***
<b>Cigarette Change</b>	--	--	--	1	.502***
<b>Smokeless Tobacco Change</b>	--	--	--	--	1

\*\*\*p < .01

Source: 2013 and 2015 Pennsylvania Youth Surveys (PAYS).

As Table 25 shows, the number of programs available to that school (based on the programming in the school district) had no significant effect on the change in students' use of alcohol, marijuana, and tobacco products. Interestingly, however, all of the substance use variables correlated very highly with one another. This indicates that the larger the change in one type of substance use between 2013 and 2015, the more likely that school saw similar changes in all alcohol, marijuana, and tobacco use.

**Table 26. Correlation Matrix of Violent Behavior and Threats of Violence with Number of Programs in School**

	<b>Number of Programs</b>	<b>Been Threatened</b>	<b>Been Attacked</b>	<b>Threatened with Weapon</b>	<b>Attacked with Weapon</b>	<b>Attacked Someone</b>
<b>Number of Programs</b>	1	.006	-.140*	-.026	-.078	.017
<b>Been Threatened</b>	--	1	.645***	.339***	.343***	.232***
<b>Been Attacked</b>	--	--	1	.310***	.407***	.248***
<b>Threatened with Weapon</b>	--	--	--	1	.651***	.282***
<b>Attacked with Weapon</b>	--	--	--	--	1	.289***
<b>Attacked Someone</b>	--	--	--	--	--	1

\*p<.05, \*\*p<.01, p<.001 Source: 2013 and 2015 Pennsylvania Youth Surveys (PAYS).

As can be seen in Table 26, the number of programs available to that school also was not significantly related to changes in violence or threats of violence in a school. The one measure that was significant was the change in the average number of attacks in a school with the number of programs in that school. The negative correlation, however, indicates that schools with more programs saw smaller amounts of change in the number of attacks at school. This is a weak coefficient, however, so should not be given too much weight. The measures of violence and threats of violence, however, were highly correlated with one another. Schools with changes in the level of violence and violent threats between 2013 and 2015 saw changes across the board in measures of violence.

The substance use and violence measures were also analyzed to see if they correlated with each other (not shown in table). There were no significant correlations between these two sets of measures

indicating that there is no relationship between a school's average change in substance use and that school's change in violent acts or threats of violence.

## **Conclusions**

### *Rural and Urban Differences in Alcohol, Tobacco, Drug Use, and Violence*

As the results showed, there were little overall differences between urban and rural students in alcohol and illicit drug use. The only meaningful difference occurred among 12<sup>th</sup> graders, where urban students showed higher rates of lifetime and past 30 day marijuana use than rural students. This is noteworthy because the research literature has had mixed findings regarding urban/rural differences in drug use. One possible reason for the difference is an attitudinal difference regarding marijuana use in rural schools; rural students reported lower interest in trying marijuana and higher disapproval for marijuana use than urban students.

The most significant urban/rural difference was on the use of tobacco products. Rural students show higher lifetime use of cigarettes and smokeless tobacco products than their urban counterparts, although both groups used electronic vapor products at a similar rate. The large proportion of rural students using tobacco products illustrates a need for programming at early grades to discourage smoking and the use of other tobacco products. Urban students report higher disapproval of smoking among their peers, indicating that rural youth view using tobacco products as more acceptable than urban youth. The substantial use of electronic vapor products should be of major concern. It appears that this new method of tobacco use is extremely popular among both urban and rural students. One possibility is that these products are viewed as safer than cigarettes so more students are willing to try them. However, they are still addictive substances and there is a need for anti-vaping programming to occur in early grade levels.

When various demographic characteristics were added into the analysis of tobacco use, family structure was the most powerful predictor of tobacco use. Those not living with both their mother and father were the most likely to use tobacco products. Schools could use this finding to target students in younger grades who would be at risk for smoking and using other tobacco products.

Results showing no differences between urban and rural students on measures of violent behavior were somewhat surprising given past research findings, although the format of the survey might not capture all instances of violent behavior. A related issue could be that those who engage in more violent activities are most likely to miss school, either through truancy or suspension, so their responses would not be counted. One of the limitations for all analyses is that the data are self-reported and not based on official statistics from the school.

### *Overall Trends in the Past Three PAYS and Associated Risk Factors for Substance Use*

Comparing 2011, 2013, and 2015 surveys revealed no differences in alcohol and drug use over time. Students used these substances at similar rates in all 3 years. There was a decline, however, in lifetime cigarette use between 2011 and 2015 for both urban and rural students.

Rural and urban students did not demonstrate meaningful differences on risk scores for various family, school, and peer-related characteristics. Analysis of how these characteristics impacted rural student substance use and violence revealed that established risk factors related to family life, school performance, and peer relations that have been associated with drug use and delinquency also have a negative impact on rural youth. Students who were found to be at risk in these areas showed higher levels of substance use and violent behavior/victimization at school. Peer-related factors were the strongest predictors of substance use and violent behavior. Schools should use these findings to target programs toward students who are associating with antisocial peers, who are not performing well in school, and who appear to have parents who promote substance use and antisocial behavior.

### *The Role of School-Based Prevention Programs*

Prevention services in rural schools did not appear to be related to changes in substance use and violence rates in schools. Between 2013 and 2015 there were small reductions in overall substance use and violence in rural schools, on average. These reductions were not attributable to prevention programs that occurred in the schools in the 2014/15 school year. One of the problems with this analysis is that only

the *number* of prevention programs in a school district was available and the data did not include details about individual programs operating in schools. Further research could examine the rural schools that had the biggest reductions in substance use between 2013 and 2015 and attempt to get more school-specific details about the programs that operated in those schools.

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1P0718