

# Evaluation of an Initiative to Reduce Youth Alcohol Abuse in the “Bourbon Country” of Kentucky

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## Abstract

*This paper describes the program evaluation results of the “STARS for Families” alcohol abuse prevention program implemented in the three school districts of Nelson County, Kentucky, an area known as the location for bourbon whiskey production in Kentucky and in the United States. All 9th grade students in these three school districts were invited to participate in the program. The baseline survey included questions related to their alcohol use, to the alcohol use in their family, and that of their peers. Follow-up surveys were conducted at 6-month, 18-month and respectively 30-month from the pretest. The survey data is compared to the county figures available from a statewide annual survey conducted by the Kentucky Incentives for Prevention Project (KIP). “STARS for Families” program uses a validated curriculum and was applied by many school districts across the United States. Overall, its implementation in Nelson County was successful, even though there were significant differences across the three school districts. The rate of increase in the number of students who used or planned to use alcohol in the near future was significantly reduced between pretest and the last follow-up. Our findings confirm that alcohol use behavior occurs in stages, and that the alcohol use habits of family and friends are strong correlates with alcohol drinking in youth.*

**Keywords:** Youth Alcohol Abuse, Binge Drinking, Multi-Component Stages (McMOS) Model, STARS for Families, Program Evaluation, Panel Study

## Introduction

Youth alcohol use was long proved to be a determinant of behavioral and mental health problems (Substance Abuse and Mental Health Services Administration, 2000; Werch et al., 2003). When children are around other people who drink alcohol they are more likely to start drinking early in life; moreover, the behaviors that are highly correlated with alcohol use, such as domestic violence

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and crime, are compounding the effect that alcohol use has on children, effect that is long lasting and has dire consequences on their adult life (Werch et al., 2000, 2003).

National statistics support the need for enhancing alcohol and drug prevention programs among youth, especially in regions known to have a high number of alcohol producers. The target population of this study is made up of students attending the secondary schools in Nelson County, Kentucky. They include the Bardstown Independent District High School, Nelson County High School, and the Bethlehem High School. Statistics also support the need for enhancing alcohol and drug prevention programs among youth. The National Institute on Drug Abuse (NIDA, 1995) data show that the first use of alcohol typically begins around the age of 13 and the use of marijuana around 14. NIDA also reports about 9.5 million Americans between ages 12-20 had at least one drink per month. Out of these, 4.4 million were “binge” drinkers (consuming 5 or more drinks in a row on a single occasion), including 1.9 million heavy drinkers (consuming 5 or more drinks on the same occasion on at least five different days). The Office of Inspector General has stated that the junior, middle and senior high school students drink 35% of all wine coolers sold in the United States and also consume 1.1 billion cans of beer. In a 1991 Morbidity and Mortality Weekly Report, the use of alcohol and other drugs is associated with the leading causes of death and injury among teenagers and young adults.

## Target Population

The target population for this longitudinal study consists of all 9<sup>th</sup> grade students attending the secondary schools in Nelson County, Kentucky. These schools include the Bardstown Independent District High School, Nelson County High School, and Bethlehem High School. Bardstown and Nelson are public school districts while Bethlehem is a private Catholic school. Bardstown and Bethlehem are located in the urban area of the county.

Nelson County is located in central Kentucky is rural with a population of 37,477 (2000 U.S. Census) with a per capita income of \$20,201 and includes the city of Bardstown has a population of approximately 10,000. The county has seen tremendous growth with a 26.1% increase from 1990 to 2000, and we expect even more growth to be seen in the 2010 Census. The three top racial categories are Caucasians who make up 92.8% of the population, African Americans (5.5%) and Asian (0.5%). Nearly all African American children attend Bardstown Independent School District, and thus schools in rural Nelson County include very few minorities. Households with persons under the age of 18 account for 40.8% and children below poverty account for 16.7%. Production of bourbon is among the primary sources of income in the county; many residents have some connection to a distillery: they either own one or are employed by one. Nelson County also ranks in the top 20% in production of tobacco and in the top 10% of KY counties in growing marijuana.

The culture of Nelson County is one that indulges frequently in high-risk underage substance abuse behaviors. These behaviors are driven partly from the presence of tobacco farming and distillery operations in the area. Although Nelson County is located amongst several “dry” counties where selling alcohol in stores is prohibited, an informal survey with community leaders indicates that the prevailing attitudes within the county support a high tolerance for youth alcohol consumption. Many residents said that it is normal to drink, it is normal for teens to drink and it is normal to get drunk.

Years of substance abuse, which can plant its roots in the teenage years, can also result in increasing the risk of disease. In 1995, cirrhosis of the liver was the eighth highest cause of death in Nelson County according to the 1995 Kentucky Annual Vital Statistics Report. Thus, substance abuse not only presents a serious community issue, but also leads to serious medical consequences. During the summer of 1997, a telephone survey was conducted on behalf of Flaget Memorial Hospital. The 400 local respondents ranked alcohol/drug abuse education at only 17 out of 20 other possible health education programs of consumer interest. Respondents aged 18-

34 with a high school or less education, tended to be more interested in such programs but the overall ranking indicates a level of denial by residents regarding the need for alcohol/drug education needs which can be attributed to the cultural acceptance of use of alcohol and tobacco products in the county.

In February 1998, the Bardstown Healthier Community Stakeholder Committee conducted a Healthy Community Survey to assess the perceptions of Nelson County residents regarding which health-related issues should receive priority attention in the community. Of the 10,000 surveys that were distributed, 3,000 respondents indicated that drugs and underage drinking and juvenile delinquency ranked in the top five issues that should receive top priority attention in Nelson County. Respondents who were less than 19 years of age believed drugs should receive top priority. The results showed that residents recognize that youth substance abuse, juvenile delinquency and other negative youth related concerns are community issues that require immediate attention.

The Nelson County Juvenile Coalition has anonymous case examples and testimonials of contact with juveniles and their families that support the concern that more and more youth have access to drugs and alcohol with some involved in “wanna be” gang behavior. Substance use patterns among Nelson County teenagers were also measured via school surveys and using data on school disciplinary actions. According to a 1994 Nelson County school system survey, 44% of high school seniors had used alcohol in the last month. Freshmen reported that 70% used alcohol, 13% had used in the last week, and 19% had used in the last month. During the 1997-1998 school year Bardstown City Schools reported the following disciplinary actions in grades 8-12: 2 alcohol violations, 3 drug violations, 56 smoking violations and tobacco violations.

The importance of this topic is not only due to its later medical or health consequences in the adult life, but also due to the relationship between alcohol and other substance abuse and juvenile delinquency and other problematic youth behavior.

## **STARS for Families Program Description**

The Youth Alcohol Initiative program was conducted by the City of Bardstown’s Center for Prevention, and was active in Nelson County during school years 2002 and 2006. The curriculum used for this program was the STARS for Families (Start Taking Alcohol Risks Seriously) and targeted primarily the 9<sup>th</sup> grade students, although a booster training was provided to the 10<sup>th</sup> and 11<sup>th</sup> grades too. This alcohol prevention program curriculum was developed by the Center for Drug Prevention Research at the University of North Florida and it has been shown to be very effective in reducing alcohol use in youth (Werch et al., 2003). STARS program consists of three main activities a) one-on-one annual 15-20 minute health education sessions conducted by a nurse or other health care provider; b) ten key facts postcards mailed to parents in sets of one or two per week for 5 to 10 weeks; and c) family take-home lessons in four weekly take-home prevention activities that parents can complete with their children.

The purpose of the program’s activities is to encourage youth to postpone alcohol use until adulthood and to provide parents with tools to enable them to manage their children’s drinking. The health consultation session is about how to avoid alcohol use; local health providers were contracted to provide health education sessions at Bardstown, Nelson and Bethlehem High Schools. The cards tell parents what they can say to their children to help them avoid alcohol. They provide feedback information about their interaction with their children and its usefulness using a prepaid postcard. The lessons include an alcohol avoidance contract for the child to sign and a feedback sheet to collect satisfaction and usage data from parents.

The theoretical framework at the basis of this curriculum is the Multi-Component Motivational Stages (McMOS) model developed by Werch and DiClemente in 1994, which suggests that the youth alcohol health behavior is evolving in a multi-stage process (Weinstein et al., 1998;

Armitage and Conner, 2000; Werch et al., 2003), and that the stage is status is determined by the number of risk and protective factors. To successfully reduce alcohol use in youth, one has to design an intervention that is prepared to address the stage specific risk factors while increasing the number of protective factors for a healthier balance.

STARS was selected by the Substance Abuse and Mental Health Administration (SAMHA) as a model program for its effectiveness in reducing underage alcohol abuse, as shown by a meta-analysis of youth substance abuse interventions across the world (Riemsma et al., 2002). The program was designed to delay the onset of alcohol use among youth, reduce quantity and frequency of alcohol use, reduce the number of youth in advanced stages of initiating alcohol use, reduce intentions to drink in the future, increase motivation to avoid alcohol use, reduce alcohol use risk factors, reduce pro-alcohol use beliefs, and increase protective factors and resistance skills. STARS model is supported by control studies that tested the effects of its health promotion strategies for preventing alcohol (Werch et al., 2000, 2003). It is a program that encourages the communication between parents and children about alcohol use prevention, and opens the opportunity for children to speak with a health care provider about substance abuse. The program aims to reduce the alcohol consumption as measured by the *past 30 day*, *past year* and *binge alcohol use* among high school students, and to reduce the number of students who intend to use alcohol in the near future (measured for next 30-days and within next 6-month).

Because family structure is an indicator of family stability and social support and was found to be associated with children's educational outcomes and school behavior, the program emphasized parental involvement. Teenagers with a single parent are more likely to smoke, use drugs, and consume alcohol, even after controlling for factors such as age, sex, race, and parent education. The STARS program coordinator sent parents a set of 10 postcards over a period of several weeks. Each postcard contained a key fact about alcohol. They were asked to discuss about the information from each postcard with their child in a 10-minute "user friendly" conversation. In addition, a set of four weekly "Family Take Home" lessons with prevention activities to use by parents and guardians with their children were provided; the lessons included an alcohol avoidance contract for the youth to sign.

Finally, STARS includes a one-on-one interactive conversation between youth and a health care provider. The health care provider delivered a 20-minute annual health consultation about how to avoid alcohol use. The intervention was designed to reach youth at specific stages of alcohol initiation and readiness for change and provides a range of prevention messages.

STARS data is compared with the Kentucky Incentives for Prevention Project (KIP) survey data from 1999 and 2002, which was collected from all counties across the state. The KIP survey was first administered in 1999, and continues to be conducted every fall semester. The KIP student survey is anonymous, voluntary, and it is open to all Kentucky school districts who want to participate. These data is critical for our study not only because it allows us to compare the schools in Nelson County with the state data, but also because it includes information on students' use of alcohol, tobacco and other drugs, on family factors related to substance abuse, and students' perception of risk and peer pressure, allowing us to test relationships between alcohol use and other factors that were not measured by STARS (ex, other substances use, peer pressure, and perception of risk).

## Data and Methods

The focus of this study was to identify if the STARS for Families program has made any difference in the alcohol use behavior of the students at three school districts in Nelson County. Further, to identify differences between the trend in alcohol use of the students participating in the program as compared to the trends in the county as measured by the KIP survey. Finally, to identify whether the differences between the trends in the STARS and KIP datasets could be similar to the trends identified in the YRBSS data.

A quasi-experimental design, specifically a panel study with four waves of data, was used for this program: there were a pretest and three follow-up measurements for each school. While there was no comparison group in this study, the multiple measurements over two years reduce significantly the threats to the internal validity (Cook & Campbell, 1979). Also, this was meant to be a population study, therefore no sampling is involved. All students in the 9th grade were invited to participate. In Bardstown and Bethlehem schools students were asked to fill out the pretest in January 2003 at the beginning of the spring semester; the 9th graders in the Nelson County schools were invited to fill out the pretest in September 2003 and in January 2004 (no duplication of records was present). The first posttest was conducted six months after the pretest while the intervention was ongoing; the second posttest was applied at one-year anniversary of the first follow-up (1.5 years from pretest); and, the third posttest was applied at the two-year anniversary (2.5 years from posttest). Table 1 shows the number of students who completed the questionnaires at each point in time. The overall retention rate for the study was 79%.

Overall, of the 256 students who completed the pretest, 96.5% completed the first posttest, 86% completed the second posttest, and 79% completed the third posttest. The attrition rate was greater for Bardstown Independent school district. The highest retention rate was in Nelson County (83%) followed closely by Bethlehem (82%).

**Table 1:** *Students Participating in STARS Panel Study*

School	Pretest (9 <sup>th</sup> grade)		Posttest 1 (9 <sup>th</sup> grade)		Posttest 2 (10 <sup>th</sup> grade)		Posttest 3 (11 <sup>th</sup> grade)	
	2002-2003		2003-2004		2004-2005		2005-2006	
	N	%	N	%	N	%	N	%
<b>Bardstown</b>	99	38.7	92	37.2	76	34.5	72	35.6
<b>Bethlehem</b>	56	21.9	58	23.5	50	22.7	46	22.8
<b>Nelson Co.</b>	101	39.5	97	39.3	94	42.7	84	41.6
<b>Total</b>	256	100.0	247	100.0	220	100.0	202	100.0

Percentages over time show that the group of students living with both biological parents had the lowest attrition rates, followed closely by the students who live only with their mother or father. Students who lived in “other” type of situation were more likely to drop out of the study.

Students who returned the parents’ signed informed consent and their assent form were asked to complete a confidential questionnaire at pretest. A new consent and assent form were not collected for each follow-up, although parents and students were provided with the procedures at each point in time.

The outcome data was collected using a questionnaire that was provided with the STARS for Families curriculum package. The questionnaires included the same validated measures for the outcomes of interest (the onset of alcohol use among youth, quantity & frequency of alcohol use, intention to drink in the future, alcohol use risk factors, motivation to avoid alcohol use, pro-alcohol use beliefs, protective factors and resistance skills, and parent-child communication about alcohol use prevention) at each point in time, and also recorded traditional socioeconomic and demographic characteristics.

Data was analyzed with SPSS 16.0 and we used traditional univariate and bivariate descriptive techniques, such as frequency distributions, central tendency and dispersion measures, along with cross-tabulations and parametric and non-parametric correlations. Data was structured for analyses in two different formats: a person-period dataset where each measurement for each child represented one row in the database, and a person-level dataset where each person has a single row in the data and the measurements for the same outcome are recorded in separate columns at each

point in time. The software used for data restructuring was SAS.

The differences in means were tested with independent t-tests when comparing two groups, dependent t-tests when comparing numeric data at two points in time. Analyses of variance were also conducted using One-Way ANOVA when comparing three or more groups, and Repeated Measures ANOVA when comparing the data collected at multiple points in time.

## Findings

Data results include descriptive information on the students' demographic and their parents' socioeconomic characteristics, on the risk and protective factors for youth alcohol use, and on the students' drinking behavior over time. To determine the impact of the program we tested differences between pretest and the posttest in students' drinking behavior over time, and as it relates to their perception about their parents' attitude toward alcohol use, to the peer pressure, and to their identified needs using the STARS constructs. Comparisons of schools on these outcomes will also be provided.

*Age, Race, Gender.* The variation in age was very limited due to the nature of the program. STARS is a health promotion program for preventing alcohol use among at-risk 11 to 15 years old children. The pretest was applied to 9<sup>th</sup> graders and 98% of students were ages 14 or 15; the first posttest was applied at the end of the same semester, thus the ages of students were very close to the pretest time. The diversity in the sample is mostly due to the Bardstown schools where 80-83% are Caucasian students, about 8-10% are African-Americans, and 10-11% are students of other race; Catholic and Nelson County schools included very few minority students. Overall, the sample included 46% males and 54% females. Due to attrition, the proportion of males and females ranged between 46% and 50% for males and between 50% and 54% for females over time.

*Family Structure and Family Functioning.* While the direct relationship between the structure of the family (single parent, two-parent families) and substance abuse in children might be questioned, it has been shown that there is a relationship between the quality of family life and substance abuse in children. Single parent families are more likely to be prone to instability, to have more disruptions in the family life than children in two-parent families.

Overall, the proportion of students who live with both biological parents was 67% at the pretest, 70% at the second posttest and 68% at the third posttest. The proportion of students in Bardstown and Nelson county schools who lived with both biological parents was around 60%, a significantly lower figure than that found in the Bethlehem school (89%). The proportion of students with the mother the head of household was 27% in Bardstown, 30% in Nelson County, and 11% in Bethlehem. Overall, at pretest, the proportion of students who lived only with their biological father or had another type of family situation was about 5% and respectively 4%, split almost evenly between Bardstown and Nelson County schools.

*Parents' Level of Education.* A widely accepted proxy for the socioeconomic status of the family is father's and mother's level of education. Teenage students with parents who have below high school education are more likely to have school behavior problems than those whose parents have at least high school education. Their educational outcomes are also more likely to be below the outcomes of students whose parents graduated from high school or college.

About 5% of students in Bardstown and Nelson County schools have parents with below high school level education, while parents of all students from Bethlehem have at least a high school education, and more than half (56% to 75%) of them have parents with a college degree, graduate or professional degree. Fathers are more likely than mothers to have a higher level of education in every school. The mothers of Bethlehem high school students are twice as likely to be college educated than mothers of students in Nelson County, and 1.5 times more likely than mothers of students in Bardstown. The differences between fathers' education levels were not as large, but the pattern was the same, majority of fathers of students at Bethlehem (64%) and at Bardstown

(58%) schools had a college education, while fathers of students in Nelson County were less likely to have a college education (45%). The differences in parental education across schools was statistically significant ( $9.95 < X^2 < 14.38$ ,  $DF=4$ ,  $0.006 < p < 0.04$ ), at each point in time.

*Free Lunch.* Lower levels of income account for some of the differences in the educational outcomes between children living with their biological parents and those in other type of family structures. Since parents' income level has not been collected, the proxy measure for income used in this study was the utilization of the free lunch benefit. One limitation of this assumption is that it is possible that not all eligible students enroll in the program. At pretest, 29% of the students in the schools in Nelson County, 19% in Bardstown, and 5% in Bethlehem high school received free lunches.

*Risk Factors.* Parents, siblings, and friends can pose an everyday risk factor for youth alcohol use, risk that is hard to overcome. The STARS questionnaire attempted to measure these influences by included items related to the incidence of substance use by parents and/or siblings, and friends. The proportion of students who stated that their father drinks alcohol a few times a month, a few times a week, or everyday was consistently about 10-15 percentage points higher than the proportion of students who indicate that their mother exhibits the same drinking behavior, overall and within each school. The most surprising finding was that a significantly higher proportion of parents of students at Bethlehem regularly consume alcohol than parents of students in the other two districts. Both fathers and mothers of Bethlehem students consume alcohol in significantly larger proportions (although they are significantly more educated) than the other parents. There were no significant differences in parent use of alcohol between Bardstown and Nelson county schools.

The overall proportion of students with siblings who are drinking alcohol ranged between about 41% at the pretest and 50% at the third posttest. The lowest proportion of siblings consuming alcohol was recorded at pretest in Bardstown schools (37%) and the highest proportion of siblings drinking alcohol was recorded in Bethlehem at the last posttest (64%).

About a quarter of the students of Bardstown and Nelson County schools admitted that their drinking behavior is influenced by their peers. The increase in the proportion of students who said they drank due to peer pressure was about 2-4% over time for Bardstown and Nelson County schools. Bethlehem students were significantly more likely to drink as a result of friends' influence; their proportions ranged between 31% at pretest and 50% at the last posttest. The same pattern was observed in the influence of someone *other* than parents, siblings and peers would have on their alcohol drinking decision. Again, students at Bethlehem seem to be more likely to be easily influenced in their drinking behavior than students from the other two school systems. Finally, only about 10-15% of the students said that advertising material has an impact on their drinking behavior; the difference between pretest and last posttest was not significant, although students in rural Nelson County seem to be more influenced by magazines and advertising material than students of the other two -urban- school systems.

*Drinking Behavior.* The overall proportion of students who drank during the previous year, planned to drink within the next 30 days, or planned to drink within the next 6-month increased over time (Table 2).

The greatest increase between pretest (12%) and last posttest (36%) was in the proportion of students who planned to drink within the 30 days following the interview. In addition, the proportion of students who stated that they intend to drink alcohol within the 6-month period after the interview doubled, from 24% to 48%. Bethlehem school had the highest proportion of students (ranging from 64% to 78%) who drank alcohol during the prior year, followed by Bardstown (54% to 65%) and by Nelson County schools (47% to 58%). The same pattern was noted on the intention to drink alcohol within 30 days and respectively within the following 6-months. As expected, due to maturing process, the proportion of students who did not drink decreased over time. Overall, at pretest 60% said that they do not drink, while at the last posttest only 44% were non-drinkers. Bardstown had a steeper decrease of non-drinkers (52% to 31%), than Nelson County (68% to 50%) and Bethlehem (57% to 44%).

Table 2: Drinking Behavior: Outcome Measures (%) by Time/Grade and by School District

Outcome	Year	Grade	Bardstown	Bethlehem	Nelson Co.	Total
During the last year, did you drink any alcohol?	2002-2003	9 <sup>th</sup>	54.1	64.3	46.5	53.3
	2003-2004	9 <sup>th</sup>	53.3	67.2	45.4	53.5
	2004-2005	10 <sup>th</sup>	57.9	74.0	51.1	58.6
	2005-2006	11 <sup>th</sup>	65.3	78.3	58.3	65.3
Do you plan to drink alcohol in the next 30 days?	2002-2003	9 <sup>th</sup>	13.3	14.8	8.9	11.9
	2003-2004	9 <sup>th</sup>	23.6	31.0	16.5	22.5
	2004-2005	10 <sup>th</sup>	27.6	42.0	22.6	28.8
	2005-2006	11 <sup>th</sup>	36.6	54.3	25.0	35.8
Do you plan to drink alcohol in the next 6 months?	2002-2003	9 <sup>th</sup>	23.5	32.1	20.8	24.3
	2003-2004	9 <sup>th</sup>	33.3	39.7	26.8	32.2
	2004-2005	10 <sup>th</sup>	43.4	52.0	33.3	41.1
	2005-2006	11 <sup>th</sup>	48.6	60.9	40.5	48.0

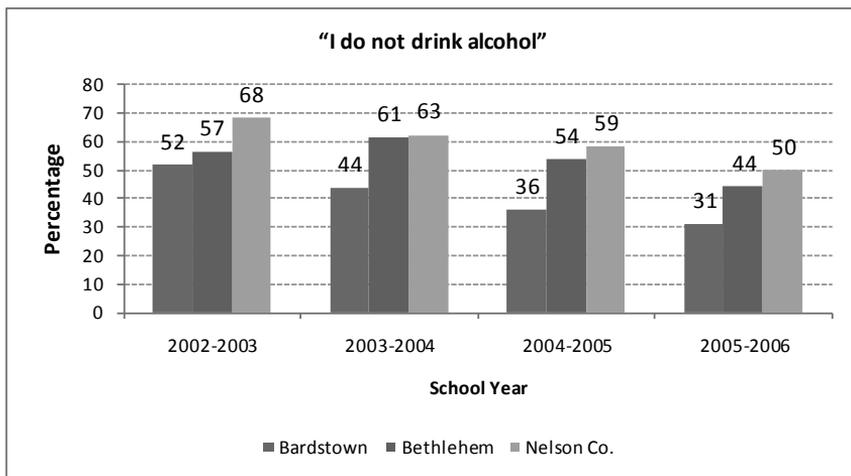


Figure 1: Proportion of students who do not drink

In Figure 1, each of the columns represents the proportion of students who did not drink by point in time in each school. At pretest, over 68% of the students in Nelson County, 60% of the students in Bethlehem, and 52% of the students within Bardstown Independent schools stated they do not drink. The comparison across schools indicate that non-drinkers in Nelson County represent about 38% of the non-drinkers from all schools and this proportion changes very little over time (+2%); the non-drinkers at Bethlehem school represent about 33% (+2% change),

while the non-drinkers in Bardstown represent 29% of the entire pretest population in study and dropped to 25% by the last posttest.

*Use of Other Substances.* The use of other substances, such as smoking cigarettes or marijuana, and the use of smokeless tobacco or cocaine appears to be less problematic than expected. Marijuana use, which seems to be the most problematic behavior of the three, has decreased significantly from 6.3% at pretest to 3.5% at the last posttest. The proportion of students who used marijuana decreased at Bethlehem from 9% to 4% and in Nelson County from 4% to 0%, while in Bardstown increased during the first year reaching a peak at 13%, and decreased at the original level (7%) by the end of the third year. The latest data also show that the proportion of Bethlehem students who smoke or use smokeless tobacco increased from 0% to 6.5%, and of those who use cocaine from 0% to 4.3%. Marijuana use is significantly more prevalent in Bardstown schools than in the other two school systems.

*Protective Factors.* During the one-on-one 15-20 minute health education sessions which were conducted in the form of health interviews, the nurses identified a series of student needs. We display the proportion of respondents who scored positively for needs on specific dimensions (Table 3) that needed to be addressed during the health interview and during the family take-home lessons; and, the Cronbach's alpha reliability coefficients (Table 4) for each of these measures.

The proportion of students identified to have needs on these dimensions ranges between 50-99%. With the exception of the "perceived benefits from avoiding alcohol" where about 50% of the students were identified the need for coaching, on all other dimensions the proportion of students in need of education was above 70%. The increase across time in the proportion of students with an identified need on the "environment/influenceability" dimension (from 84% to 94%) is indicative of the peer pressure that increases with the students' age. However, the decrease across time in the proportion of students with an identified need on the "self-efficacy/behavioral capability" shows that these students are more equipped to resist peer pressure than they were at pretest. The measure of the *situation* at the last posttest appear to be the least reliable ( $\alpha=0.535$ ) while the measure of perceived *benefits from avoiding alcohol* is most reliable ( $\alpha=0.858$ ).

**Table 3:** *Proportion of Students with Specific Identified Needs*

STARS Risk/Protective Factors	Pretest	Posttest 1	Posttest 2	Posttest 3
<b>The Environment and Influenceability</b>	83.6	88.3	90.5	94.1
<b>Expectancies</b>	73.8	72.1	77.3	82.7
<b>Self-Efficacy and Behavioral Capability</b>	84.8	71.7	73.2	65.3
<b>Situation, Perceived Prevalence</b>	91.4	90.7	91.4	97.5
<b>Expectations</b>	92.2	89.1	92.3	95.0
<b>Motivation and Intentions</b>	99.2	98.4	99.1	99.5
<b>Perceived Susceptibility, Severity of Alcohol Problems</b>	85.2	73.7	77.7	81.7
<b>Perceived Benefits from Avoiding Alcohol</b>	55.1	44.9	49.5	56.9
<b>Self Evaluation, Self Monitoring, Self Reinforcement</b>	97.7	96.8	94.5	96.5

**Table 4:** *Cronbach's  $\alpha$  Reliability Coefficients for the STARS Constructs by Time*

STARS Risk/Protective Factors	Pretest	Posttest 1	Posttest 2	Posttest 3
<b>The Environment and Influenceability</b>	0.760	0.729	0.767	0.725
<b>Expectancies</b>	0.709	0.734	0.782	0.769
<b>Self-Efficacy and Behavioral Capability</b>	0.698	0.615	0.621	0.659
<b>Situation (Perceived Prevalence)</b>	0.600	0.555	0.734	0.535
<b>Expectations</b>	0.725	0.737	0.773	0.775
<b>Motivation and Intentions</b>	0.613	0.671	0.688	0.667
<b>Perceived Susceptibility Severity of Alcohol Problems</b>	0.652	0.813	0.834	0.787
<b>Perceived Benefits from Avoiding Alcohol</b>	0.684	0.742	0.867	0.858
<b>Self Evaluation, Monitoring, and Reinforcement</b>	0.700	0.828	0.857	0.856

Program Performance Measures. Using the person-period dataset we conducted One-Way ANOVAs to compare the pretest scores with the posttests for several questions that dealt with the parents', siblings' and peers' attitude toward their drinking behavior.

We found no significant differences between the three points in time ( $F(3.912) = 0.878$ ,  $p=0.452$ ) in the students' perception of what their parents' think when learning about their alcohol drinking choices ("How would your parents feel if they found out you drank alcohol?"). Over 90% of the students, in each wave of data, stated that their parents would not approve alcohol use if they knew about it. When this analysis of variance was conducted by school, we found no difference across time within Nelson Co. ( $F(3.370)=1.325$ ,  $p=0.266$ ), Bethlehem ( $F(3.205)=0.914$ ,  $p=0.435$ ), or Bardstown Independent ( $F(2.329)=1.056$ ,  $p=0.368$ ) school districts.

There were highly significant differences ( $F(3.917)=4.759$ ,  $p=0.003$ ) between pretest and all posttests, and from one posttest to another, when students were asked whether their parents condone drinking behavior ("My parents think it's okay for me to drink alcohol"). Again, over 90% of the students said that their parents would "disagree" or "disagree a lot" with that statement. The analysis by school showed that there were no differences within Bardstown subsample ( $F(3.332)=1.477$ ,  $p=0.221$ ), and there were significant differences between the students within the Bethlehem ( $F(3.209)=2.890$ ,  $p=0.037$ ) and marginally significant within Nelson County ( $F(3.370)=2.568$ ,  $p=0.054$ ). This means that the overall difference in the sample is primarily due to the differences between school districts. The student body in the two public school districts is relatively homogeneous in terms of students' perception on these two items, while at Bethlehem students do not think alike.

STARS data showed highly significant improvements ( $F(3.915)=9.955$ ,  $p<0.000$ ) in students' ability to refuse alcohol when offered by friends or especially when offered by someone else (Figure 2). The improvement was significant in all school districts.

We found less encouraging results with regards to the students' intent to use alcohol within the following six months ( $F(3.917)=10.946$ ,  $p<0.000$ ). All schools have significantly higher number of students who think of or plan to drink in the near future, and their proportions grew significantly from one point in time to another. These results suggest the need for continuous, sustainable health behavior modification interventions that address the variety of needs of the high school students in this area, needs that manifest themselves in problematic behavior such as alcohol drinking, and lead to even more complex social and health problems as children enter adulthood.

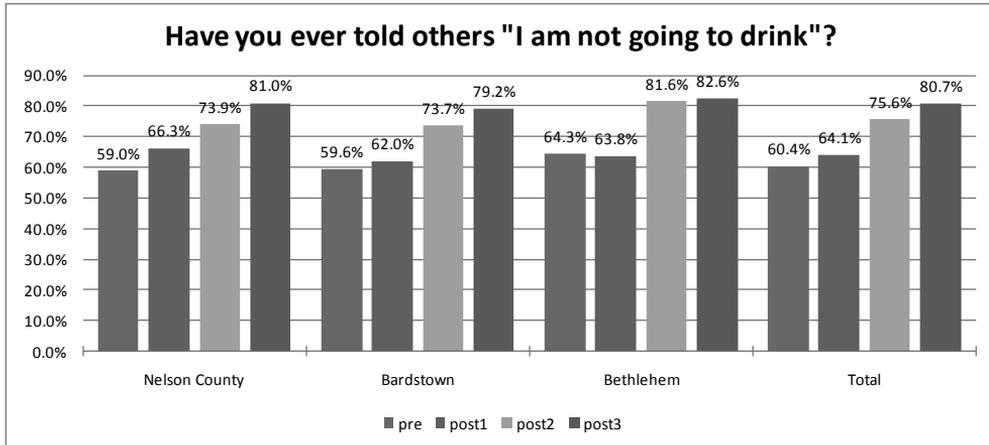


Figure 2: Proportion with Ability to Refuse Alcohol

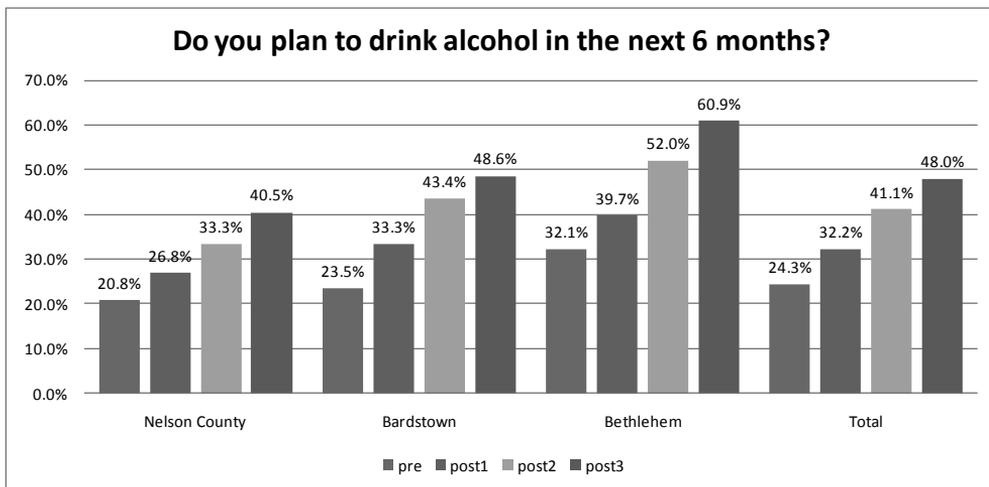


Figure 3: Proportion with Intent to Consume Alcohol

*STARS versus KIP.* Due to the fact that alcohol use increases with age, the comparison of STARS data with the KIP data for Nelson County is critical. This allows us to compare the rates of alcohol use in the STARS participant group to the overall figures for the county. The intent of to drink alcohol was not measured in the KIP data, but we were able to compare a) the proportion of students who used alcohol during the past 30 day, b) proportion of students who used alcohol during the past year, and c) proportion of students who engage in binge drinking. Note that binge drinking is defined as “5 or more drinks in a row”. Table 5 displays the proportion of students who have consumed alcohol during the past 30 days, during the past 12 months, and ho engaged in binge drinking during the past two weeks.

**Table 5:** Outcome Measures by Frequency of Behavior

Question/ Outcome	Count	Pretest (2003)	Post 1 (2004)	Post 2 (2005)	Post 3 (2006)	KIP 2006	
		9 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	10 <sup>th</sup>	12 <sup>th</sup>
<b>During the past 30 days, on how many days have you had at least one drink of alcohol?</b>	0	72.3	74.1	63.2	58.9	59.3	48.8
	1-2	19.5	15.4	18.2	18.3	20.0	19.6
	3-5	3.5	5.3	11.4	13.4	8.7	15.2
	6+	4.7	5.3	7.3	8.9	12.0	16.5
<b>During the last year, did you drink any alcohol?</b>	No	46.7	46.5	41.4	34.7	33.3	24.5
<b>During the past 30 days how many times have you had 5+ drinks in a row?</b>	0	86.2	81.7	69.0	83.3	73.7	65.0
	1-2	9.1	11.2	20.2	9.5	18.1	19.7
	3 +	4.7	7.1	10.8	7.1	8.2	15.4

At pretest 72.3% of the 9<sup>th</sup> grade students indicated that they did not drink *during the past 30 days*. About 1.5 years later, at the second follow-up, 63.2% of the STARS students had no drinks in the past month as compared to the county's average of 59.3%. Another year later the proportion of students with zero drinks in the past month dropped to 58.9% in the STARS group as compared to the county average of only 48.8%. Of all three school districts, Bethlehem (40%) was the worse off at the last posttest, their outcomes being below county's average proportion (48.8%) of students who did not drink during the past 30 days, while Nelson County school district had the best mark (73.8%).

The consumption of alcohol *during the past year* indicates a similar pattern as the one identified above. Although the proportion of students who drank alcohol during the past year increased steadily over time, STARS participants still have higher proportion of students who did not drink in the 10<sup>th</sup> grade (44.8%) and then in 11<sup>th</sup> grade (34.7%) as compared to KIP averages for both 10<sup>th</sup> (33.3%) and 12<sup>th</sup> (24.5%) grades. Again, at the last posttest, a significantly lower proportion of Bethlehem students (21.7%) than Bardstown (34.7%) and Nelson County (41.7%) school districts abstained from consuming alcohol during the past year.

*Binge drinking* data shows that at pretest about 86% of all students claimed that they did not binge during the past two weeks. This proportion dropped to 74% by the second year, and to 71% by the last posttest. As all other drinking behavior, binge drinking is the least problematic in Nelson County district schools (15-17%) and most problematic in Bethlehem Catholic School, where the proportion of students who engage in binge drinking increased from about 16% at pretest to 40% after 1.5 years and to 49% after 2.5 years from the pretest. Furthermore, at Bethlehem not only the proportion of students who engage in binge drinking is higher, but the frequency in which they engage in this behavior is significantly worse than in the other two school districts ( $F(2,198)=5.273, p=0.006$ ) at the last follow-up.

These figures show that the culture of alcohol and substance use varies greatly from one school to another. Spearman correlations further showed that if one parent drinks the other most likely does too ( $Rho=0.413, p<0.000$ ); parents' drinking behavior increased the likelihood that children consumed alcohol within the past 30 days ( $Rho=0.178, p<0.000$ ), within the past year ( $Rho=0.246, p<0.000$ ), and that they are more likely to engage in binge drinking ( $Rho=0.123, p<0.000$ ).

## Discussion

Nelson and its surrounding counties are known for high rates of alcohol and other substances use, and as in other school districts, the proportion of children in the school who engaged in drinking, smoking and use of other substances, increases with their age.

Students who participated in the STARS program demonstrated a reduction in risk factors for alcohol consumption. Between pre and the last posttest, individual student needs for information on specific areas appear to have declined, suggesting that students have assimilated education provided by the Health Educator. This information is also consistent with the stated goals of this project and appears to have had an impact in the measures of alcohol use. Although, a reduction in the acceptance of alcohol use in teenagers is evident, reported use continues to increase with age. A greater than expected proportion of students reported no use of alcohol during the past year and during the past 30 days, and the rate of binge drinking increased as well. However, when data is compared with the county average, which includes the students who did not participate in the program, the picture changes significantly. The data confirms that the STARS for Families program made a significant difference in the proportion of youth who delay and reduce alcohol consumption. The data also shows that the three school districts located within the Nelson County, Kentucky, have very different student populations in terms of family socioeconomic status, parents' drinking habits, and student drinking habits. Bardstown Independent and Nelson County school districts experienced statistically significant reduction in all three outcomes, while Bethlehem High school scored significantly worse than the other two districts, dragging down the county's average.

KIP 2006 data show that there has been a steady decrease over the years in the proportion of students who drink alcohol in Nelson County, but the decrease was even greater in the group of students who participated in the STAR program. Thus, we conclude that STARS for Families program was successful in Nelson County, Kentucky because it reduced the rate of increase. We recommend that school officials and health educators are considering another curriculum for the Bethlehem school district that may prove more successful with this population.

The study included relatively small sample sizes that limited the type of data analyses that could be conducted; the lack of a true (randomized or at least matched) comparison group limited our ability to establish more complex relationships, while self-selection in the STARS program also made it difficult to generalize the results to similar populations. The lack of access to the entire state KIP dataset limited the type of comparisons that could be made and, the lack of access to the program costs did not allow us to explore how cost-effective this program is. However, with all these limitations that could and should be addressed in the future, we can still conclude that the program has been successfully implemented in at least two of the three school districts.

## Conclusions

The objective of this article was to describe the impact made by a four-year alcohol prevention program, implemented in schools with students of ages 10 to 17, on students' alcohol drinking behavior and on their intent to drink in the near future. The study was conducted by the Center for Prevention of Bardstown, Kentucky, who later commissioned the data analyses for the evaluation with Drs. Stone and Hendrix. We used a panel study design with four waves, a pretest and three follow-ups; the survey instrument was designed for the STARS for Families curriculum by Dr. Chudley Werch of the University of North Florida. Data was collected at pretest from 256 students of which 202 have still been part of the study at the third follow-up.

Data analyses included correlations, contingency analyses, comparisons of means and analyses of variances; the results show that the program succeeded to slow down the rate of increase in alcohol drinking that occurs with age for the youth in the public schools in both urban and rural

areas; but, that it did not have the significant impact was hoped for in the Bethlehem catholic school. This finding is interesting because Bethlehem students have highly educated parents, but with worse alcohol drinking habits than the less educated parents of the students in the other two school districts. Thus, we conclude that parents' drinking habits mitigate the positive effects that their higher education could have on the alcohol use of their children. It is apparent that drinking is more accepted in the catholic community of this area and thus, it will be quite challenging for a school program to make a difference without a stronger parental involvement.

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