AN ANALYSIS OF THE RELATIONSHIP BETWEEN
SUBSTANCE USE, SELECTED DEMOGRAPHICS AND
ACADEMIC ACHIEVEMENT AMONG MIDDLE SCHOOL
AGED YOUTH IN AN URBAN MIDWESTERN COUNTY

A dissertation submitted to the
Kent State University College
of Education, Health and Human Services
in partial fulfillment of the requirements
for the degree of Doctor of Philosophy

by

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May 2014
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AN ANALYSIS OF THE RELATIONSHIP BETWEEN SUBSTANCE USE, SELECTED DEMOGRAPHICS AND ACADEMIC ACHIEVEMENT AMONG MIDDLE SCHOOL AGED YOUTH IN AN URBAN MIDWEST COUNTRY (240 pp.)

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**Background:** Among adolescents, use of alcohol, tobacco, and marijuana have been associated with numerous health risks and compromised education outcomes. The purpose of this study was to examine the relationship between substance use, selected demographics and academic achievement among middle school aged youth in an urban Midwestern county. **Methods:** Secondary analyses were conducted based on data from the 2012 Cuyahoga County Youth Risk Behavior Survey (YRBS). Univariate analyses were conducted to provide a descriptive profile, bivariate analyses assessed associations between variables, and multivariate analyses were conducted to establish odds ratios. **Results:** Ever or current use of alcohol was the most prevalent drug, alone or in combination with other drugs. The exception to this finding was related to the current use of marijuana and tobacco use. Academic achievement was significantly associated with sex, race, and SES. There was a significant association with ever or current use of alcohol, tobacco, and marijuana with grade level and race. High academic achievers were more likely to be never or not current users of drugs. Low academic achievers were between 1.7-2.4 times more likely to be current or ever users of drugs. Further, low academic achievers were between 2-3 times more likely to be ever or current poly drug users. **Conclusions:** Use of alcohol, tobacco, or marijuana is associated with lower
academic achievement. Exploration into the use of alcohol, particularly related to
perception of risk and parental permissiveness should be explored. Multi-product and
multi-drug use related to the use of little cigars among this population should be further
explored. Finally, research related to other categories of risk behavior and their
relationship to academic achievement have the potential to improve both health and
educational outcomes.
ACKNOWLEDGMENTS

I am incredibly grateful for the support I received in the completion of the dissertation process. I would like to thank the members of my dissertation committee – Drs. Cynthia Symons, Kele Ding, and Erika Trapl. Dr. Symons – It’s not possible for me to describe or thank you enough for all that I have learned from you during this process. I appreciate your sage advice, patience, and professionalism. Dr. Ding – I appreciate your guidance, flexibility, and encouragement with this project. Dr. Erika Trapl – While I have known the joys of working with you as a colleague, I now know first-hand the commitment you make when working with students. Thank you for your support, encouragement, and insight throughout this process.

To the faculty in Health Education and Promotion Program at Kent State University – thank you for creating an environment in which I was able to learn and grow, both personally and professionally. To my doctorate peers and colleagues of the “unsatisfactory table” – Manny Crawley, Liz Fettrow, Holly Gerzina, and Terry Robinson - thank you for the support, collaboration, and teamwork that made this process so enjoyable. To Laura Santurri – I too couldn’t think of a better person to accompany me on this journey. I’ve learned more from you than I can express and will always be grateful for your friendship.

To my colleagues at the Master of Public Health Program at Case Western Reserve University – thank you for your patience and flexibility with this process. Scott Frank – thank you for your encouragement to begin my doctorate. Mendel Singer – thank you for helping me embrace statistics without fear and even some laughter.

To all of my friends and extended family members – the constant encouragement and support was appreciated. A special thank you to my friends Kelli Davis, Paris Huggins,
LaShonda Keith, and Alisa Smith – you ladies were my rock! Thank you for consistently checking in and for providing unwavering support. Special thank you to my aunt Brenda Taylor-Hines, my aunt Yvonne Taylor, and other mother Roslyn Carter – for everything from Scrabble, to providing quiet hideaways, and taking my distressed phone calls. To my fellow doctorate cousins – Nicole Taylor-Buckner and Samantha Williams - I am so proud of you ladies! To my aunts Carol Knight and Faye Knight – thank you for supporting my margarita therapy as needed.

I am especially grateful to my immediate family. To my grandparents – Joy Knight, Raymond Knight, Naomi Taylor, Margaret Taylor, and Roosevelt Taylor – your lives have been examples of strength and perseverance that have encouraged me during my every step of this process. To my siblings – Shenee, Kelly, and Darryl – Thank you for all of the ways in which you individually provided support. Thank you for being a friendly voice, bringing over the kids to give me kisses, and your understanding of my never-ending schooling. I am really finished now! A special thank you my brother-in-law Greg Hicks for calling just to hear my voice, make sure I was okay, and giving me a dose of humor. To my nieces and nephews – Darrius, Tyree, Tyrese, Terrance, Gregory, Lauryn, Kailee, Darryl, and Layton – Dream big, my loves. You really can do anything you want to do and are willing to work for. It will be my pleasure to help support your dreams in the same way that you have so lovingly helped support mine. Most importantly, thank you to my parents, Raymond and Linda Knight. As your daughter you’ve taught me valuable lessons throughout my life. You are, always have been, and will continue to be my favorite teachers. Thank you for supporting my dreams, always being present, leading by example, and for encouraging me to do all of the same with others. You promised me that if I worked hard, I would have options – and provided a safe place for me to try and try again. I love and appreciate you more than I can possibly express!
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CHAPTER I
INTRODUCTION

With publication of Healthy People – The Surgeon General’s Report on Health Promotion and Disease Prevention in 1979, a national, multi-decade, public health initiative was established. This report (1979):

- detailed the extent to which health gains had occurred within the previous century,
- provided insight into emerging health challenges, and
- identified specific priority areas for action through the establishment of broad national health goals.

At that time, both length and quality of life measures for Americans had improved, consistent with successful public health efforts related to: the prevention and control of infectious and communicable diseases; and, reductions in unintentional injuries and improvements in occupational safety (CDC, 1999). These public health successes resulted in a shift in focus to the prevention and reduction of chronic diseases and conditions based on evidence supporting the influence of behavioral, genetic and environmental factors on health (Stokols, 1996). Accordingly, this Surgeon General’s report presented a critical challenge to address existing health behaviors and policies that supported the leading causes of morbidity and mortality related to substance use, sedentary lifestyles, and poor nutrition (Green & Kreuter, 1990).

Led by the Institute of Medicine (IOM), a public and private partnership of health and health care organizations in the United States convened to provide support for the
report. This collaborative effort explored both the supporting context and current status of health within the United States. At the request of the Office of the Surgeon General, the collaborative gathered relevant data that was compiled into a series of reports designed to support the development of the 1979 report. The IOM developed a series of supporting documents, one in particular specific to health promotion and disease prevention, that identified potential health gains across five age group categories (Breslow, 1987). This supplemental document provided clear evidence to support the presence of unique health challenges at each life stage (McGinnis, 1982). As a function of these efforts, an evidence-based platform for national prevention programs and policies was created. Evidence specific to recent health trends, policies, and programs was used to make recommendations for potential improvements in health across the lifespan (Zwick, 1983). Accordingly, the 1979 Surgeon General’s report included the following five national health goals based on age group categories (DHEW, 1979, p. 31-107):

1. “To reduce infant mortality by at least 35%, to fewer than 9 deaths per 1000 live births.

2. To reduce deaths among children aged 1 to 14 years by at least 20%, to fewer than 34 per 10,000.

3. To reduce deaths among people aged 15 to 24 years by at least 20%, to fewer than 93 per 100,000.

4. To reduce deaths among people aged 15 to 64 years by at least 24%, to fewer than 400 per 100,000.
5. To reduce the average annual number of days of restricted activity due to acute and chronic conditions by 20%, to fewer than 30 days per year for people aged 65 years and older.”

To provide further clarity for these goals, concrete definitions were established for each age specific category. Additionally, for each goal, sub-goals were identified based on relevant data specific to the leading causes of morbidity, mortality, and preventable death for each age group category (McGinnis, 1982). For each sub-goal evidence demonstrating the rationale for the inclusion of the sub-goal was provided. Included as part of the rationale for the definitions, goals, and sub-goals was information about environmental and contextual factors that contributed to the current health status among the age group at that time.

For example, the definition of childhood incorporated youth ages one to 14; and, the definition of adolescents and young adults was youth ages 15 to 24. For the lifespan category of children, a sub-goal was included related to enhancing childhood growth and development and reducing childhood accidents and injuries. Of note among the evidence supporting this sub-goal, was the reference to “inadequate school functioning” (DHEW, 1979, p. 53) as a contributing factor to child development. This was the first indication of the relationship between schools and the health of youth within the Healthy People initiative.

Further, the lifespan category of adolescents and young adults incorporated as goals reducing fatal motor injuries and vehicle accidents; and, reducing alcohol and drug misuse. In comparison to the health gains cited among other lifespan categories, among
adolescents and young adults, the report cited a mortality rate higher than it had been reported in the previous twenty years. Detailed among the factors most commonly cited as contributing to the mortality rate were unintentional injuries and substance use. The co-occurrence of alcohol and automobile accidents was provided as an example of the extent to which risk behaviors clustered and contributed to the increased mortality rate among adolescents (Botvin, 1995). The consumption of alcohol and use of other drugs was explored to specifically address patterns of use among this age group such as early onset, current use, and binge use. These patterns of use as well as the subsequent physical, social, and psychological consequences further highlighted the impact of risk behaviors on the lives of adolescents.

Appropriately, the identification of goals related to specific age group categories was not the entire focus on the 1979 Surgeon General’s report. Former Assistant Surgeon General and former Director of the United States Office of Disease Prevention, Michael McGinnis, had been cited as one of the primary architects of the initiative. His efforts and contribution to the initiative were based largely on his work for national and international prevention initiatives. To this end, he cited a three-fold purpose for the 1979 report including:

1. To put the notion of prevention into a conceptual framework that made it easier to grasp by the American people.
2. To make it clear what prevention could actually achieve.
3. To drive data collection to improve our data systems to make sure it focused on the issues most important. (ADPH, 2009, p. 4-7)
The organization of the 1979 Surgeon General’s report was predicated on both a goal-setting strategy and management by objectives approach that provided a framework through which a national prevention platform was to be established (McGinnis, 1990). Then Surgeon General Julius B. Richmond, incorporated sub-goals with a prevention orientation and acknowledged that while the concept of prevention was not new, it was considered a growing field for which the knowledge base and specific measures were still emerging. Dr. Richmond asserted his perception that this document assisted with the next evolution in public health stating: “This approach involved our moving beyond diagnosis and treatment and beyond our well-developed efforts at disease prevention to an emphasis on health promotion or improvements in the quality of life (Richmond, 1979, p. 482).”

Fittingly, the inclusion of specific actions designed to elicit progress towards the identified health goals were categorized as priority activities. Designation as a priority activity was an indication that immediate and targeted actions were to be taken, specifically related to improving the health of the populations to efforts such as prevention, protection, and promotion to improve the health of the population. These actions included:

- preventive services defined as services delivered to individuals by health providers;
- health protection defined as measures which can be used by governmental and other agencies, as well as by industry, to protect people from harm; and
- health promotion defined as activities which individuals and communities used to promote healthy lifestyles. (DHEW, 1979, p. 123).

Within each of these priorities activities, specific health categories and conditions were identified. Anticipated action steps for one or more lifespan categories could be found within all of the priority areas. The priority areas were identified and designed to provide a framework around which measurable objectives were to be developed. The orientation of these priority action areas reflected the efforts of the previously identified public-private partnership led by the United States Public Health Service.

As an example, smoking cessation and reducing misuse of alcohol and other drugs were two of the health categories and conditions within the priority area of health promotion. Multiple strategies were included among this category for individuals across the lifespan. Interestingly, alcohol, tobacco, and other drug use were explicitly included in both descriptions of and data related to achieving progress towards the identified sub-goals for both lifespan categories for children, and adolescents and young adults. Data supporting the role of injuries as one of the leading causes of morbidity and mortality within these populations provided additional insight into the role of substance use as a contributing factor (DHHS, 1985). Further, based on their daily role in supporting more than 40 million youth, schools were explicitly identified within the report as a venue for action and intervention.

In total, as a part of the 1979 report, broad national health goals for unique life span categories were established around which targeted actions for prevention, protection, and promotion were identified. Promoting Health/Preventing Disease:
Objectives for the Nation, published by the Public Health Service of the U. S. Department of Health and Human Services (DHHS) in 1980, supported the national health goals included in the Surgeon General’s report by identifying quantifiable objectives. Maintaining a focus on the ability of prevention to improve the health of the nation, this companion document was organized around the three previously identified strategies: preventive services; health protection; and health promotion. Among this plan were 226 quantifiable and measurable objectives, collected under the following 15 priority areas including:

- high blood pressure control,
- family planning,
- pregnancy and infant health,
- immunization,
- sexually transmitted diseases,
- toxic agent control,
- occupational safety and health,
- accident prevention and injury control,
- fluoridation and dental health,
- surveillance and control of infectious diseases,
- smoking and health,
- misuse of alcohol and drugs,
- nutrition,
- physical fitness and exercise,
- control of stress and violent behavior,

Within each of these priority areas, detailed information about the nature and extent of the health concern and data documenting the current status and trends were provided. Further, for each priority area prevention and promotion measures, objectives, key assumptions, and data sources were identified.

Continuing the collaborative nature of this national public health initiative, the objectives were developed as part of an extensive process through consultation with scientific experts from diverse governmental and non-governmental organizations. Initiated by the work of national experts at a conference sponsored by the US Department of Health, Education, and Welfare, work groups were created to develop specific objectives. Though the use of objectives historically had guided public health efforts, a Management by Objectives (MBO) approach was incorporated largely based on planning efforts that had contributed to the success of several global health initiatives (Breslow, 1987). Criteria for the objectives required that they (CDC, 1990):

- addressed high priority areas;
- targeted health status improvements, prevention, protection, and reduction of risk;
- were quantifiable and measurable; and
- were attainable and scientifically based.

While the Healthy People initiative was national in scope, the cooperation of states was imperative to its success. To that end, the ability of states to adopt and implement these efforts was considered heavily in the organization and structure of the
initiative. Importantly, the initiative was structured in a manner that allowed for states to individualize integration based on geographic trends and collect relevant data at the state level. The combination of the goal setting strategy and management by objective approach was vital in allowing for both strategic implementation of the Healthy People initiative at the state level.

While the 1980 objectives were organized around priority areas, information specific to age group categories also was integrated as a part of the focus of the initiative. For example, information related to children, adolescents, and young adults was included, as necessary, depending on the extent to which there were unique health implications for those target populations. As such, integrated as a part of the action area of health protection was the priority area of accident prevention and injury control; and, among the action area of health promotion was the priority area of the control of stress and violent behaviors. Within each of these categories, information related to alcohol, tobacco, and marijuana use was included primarily in the context of their roles as contributing factors to intentional and unintentional injuries. Smoking and health and, misuse of alcohol and drugs were identified as topic areas, highlighting their role in contributing to the overall health of the population.

Further, among each of the identified priority areas, the current status, emerging trends, and specific actions to be taken were delineated. Specific measures designed to support the identified objectives were included based on the following:

- education,
- information,
- service,
- technology,
- legislation and regulation, and
- economic factors.

As an example, in order to achieve these objectives, schools were included among the litany of public and private institutions from which action would be required. School specific strategies and activities were integrated within the detailed action steps associated with each identified priority area. While not specific to schools, the combination of all of the above mentioned strategies were advanced as part of the framework to support and monitor progress towards the identified objectives and national health goals.

The 1980 Healthy People publication identified several data requirements as crosscutting concerns, including:

- the need for reliable and high quality data to establish baseline prevalence of health behaviors and conditions, and
- the development of surveillance systems for various diseases (non-infectious) and injuries.

During this time, national estimates of health risk behavior data were obtained periodically through efforts of the National Center for Health Statistics (NCHS) including the National Health Interview Survey (NHIS). The NHIS had been conducted since 1957 as a household interview survey. At the time of the development of the *1990 Health Objectives for the Nation*, the NHIS was designated as the primary tracking tool to
monitor progress towards many of the identified objectives (Schoenborn, 1988). While data related to each of the priority areas were compiled and reviewed as a part of the process for objective development, there were clear deficiencies in the availability and consistency of data. Specifically, the scarcity of state level data was a limiting factor in allowing in the development of national health profiles. For this reason, state level data collection was needed in order to monitor and track progress towards the achievement of the prioritized goals and objectives for each state.

While the inclusion of measurable objectives provided a foundation for monitoring progress toward the identified goals, it also supported efforts related to surveillance and evaluation (CDC, 1989). According to Green, Wilson and Bauer (1983), while data were the driving force behind the development of the national health goals, at that time less than 50% of them could be measured by existing national collection and management data systems. As such, due to the limitations of existing data collection capacity, a priority area related to surveillance and data systems was established. The Behavioral Risk Factor Surveillance System (BRFSS) was developed by the CDC in 1984, as a part of efforts to develop a national surveillance system. The BRFSS established a mechanism to collect state level data related to health risk behaviors, chronic diseases and conditions, and utilization of preventive services (CDC, 2013). This telephone-based survey was constructed to support data collection about the leading causes of morbidity and mortality among adults. In addition, consistent with the emphasis on the integration of the Healthy People initiative at the state level, the BRFSS was administered in a manner that allowed for a representative sample at the state level.
After nearly seven years of evaluating the Healthy People Initiative and monitoring progress toward the identified goals, the Public Health Service began developing national health goals to be achieved by the year 2000. This process was begun in 1987 and was based upon (CDC, 1989):

- documented areas of success,
- objectives that remained to be met, and
- emerging public health problems.

Schools, for instance, already were identified as an essential venue for intervention based on their daily role in the lives of youth. With the presence of objectives related to children, adolescents, and young adults, it became imperative to extend data collection and surveillance efforts to include these specific target populations. Appropriately, the development of a national surveillance system targeting youth utilizing schools as the mechanism for administration was initiated. This is an example of the manner in which each successive iteration of Healthy People has been strategically designed to build upon the previous successes and challenges of that which preceded it.

Led by the Centers for Disease Control and Prevention (CDC), the development of the Youth Risk Behavior Surveillance System (YRBSS) began in 1988 as a collaborative effort between federal agencies. A steering committee of representatives from federal agencies, including the Department of Education (DOE) and state representatives from the Society of State Directors of Health, Physical Education and Recreation (SSDPER), led the effort to develop the YRBSS. This unique collaboration of public and private sector professionals and others in the field of health and education
was essential to the future implementation of the survey. Survey administration was planned to occur during a forty-five minute period of time in a school day. The instrument contained items related to the six broad categories of health behavior. The YRBSS steering committee was divided into work groups specific to each of the six identified risk behavior categories. Each subcommittee was charged with identifying content specific priority behaviors and the development of related survey items. This process occurred over the course of one year, leading to the development of the Youth Risk Behavior Survey (YRBS). A core questionnaire of approximately seventy-five items was created. To this day, the YRBSS serves as a data monitoring system designed to capture information about health risk behaviors among youth responsible for the leading causes of morbidity and mortality in the United States.

A supplemental volume of *Public Health Reports* detailed the development of the YRBSS including (Kolbe, Kann, & Collins, 1993):

- the identification of risk behavior categories,
- supporting data related to morbidity and mortality,
- data driven decision making related to the development of national health objectives, and
- the development of YRBS items based on pilot and field data.

In the forward of the volume (1993), J. Michael McGinnis then Deputy Assistant Secretary for Health and Lloyd Kolbe then Director of the Division of Adolescent and School Health, presented a call to action to focus on the prevention of risk behaviors among this population. To that end, detailed epidemiologic data related to short and long
term health outcomes among adolescents was identified. Six broad categories of behaviors as the major contributors of health risks were identified based on a review of data related to the leading causes of morbidity and mortality among adults. These categories, commonly referred to as the CDC6, include (Kolbe, Kann & Collins, 1993):

- unintentional and intentional injuries,
- tobacco use,
- alcohol and other drug use,
- sexual behaviors,
- dietary behaviors, and
- physical activity.

For each risk behavior category, a panel of scientific experts identified priority behaviors using data, collected from multiple sources, related to morbidity and mortality including (Marcus et. al, 1993): prevalence, particularly among sub-populations; and, impact to negative health outcomes. Supported by the national health objectives, items were then developed by each panel and refined by data gathered during pilot and field-testing of survey instruments conducted by the National Center for Health Statistics (Waxweiler, Harel & O’Carroll, 1993). Overall, items were based solely on behaviors or actions associated with specific risk behavior categories. Items were intentionally excluded based on knowledge, attitudes, perceptions, or other determinants of risk behaviors. Because of this, a limited number of items were included on the instrument, requiring the elimination or condensing of specific topics within all categories. Combined, however, items contained within the YRBS were designed to
comprehensively capture the nature and extent of health risk behaviors among youth. The subsequent data represents a snap shot or point in time accounting of the self-reported youth risk behaviors (CDC, 2013).

Recognition and management of unique data challenges would continue as the Healthy People Initiative continued to evolve. Simultaneous with the development and implementation of surveillance efforts designed to monitor progress towards national health goals, Healthy People 2000 was released in September 1990. This phase of the Healthy People Initiative was organized around twenty-two priority areas and 312 objectives associated with the overarching goals of (DHHS, 1990):

- increasing healthy years of life for Americans,
- reducing health disparities among Americans; and
- achieving access towards prevention and related health services for all Americans.

Healthy People 2000 was developed through a collaborative effort of federal and non-federal organizations known as the Healthy People 2000 Consortium. Public hearings and testimonies were held in various forums in advance of a federal work group charged with the task of developing a draft of the revised objectives. Criteria for the development of related objectives were established based on (CDC, 1990):

- highest prioritization,
- identification of targeted improvements,
- the ability to be quantified, and
- realistic attainability based on scientific measure.
Consistent with the organization of the 1979 report and sustained throughout the initiative, all but one of the twenty-two priority areas were grouped into the three categories of health promotion, health protection, and preventive services. The one exception was related to data and related surveillance efforts.

With the goals of the previous iteration being cited as too heavily focused on mortality, *Healthy People 2000* incorporated goals related to both quality of life and the reduction of health disparities (McElroy & Crump, 1994). In particular, as a part of *Healthy People 2000*, 22 priority areas were identified including the following areas with clear implications for the lifespan categories of children, adolescents, and young adults:

- tobacco,
- substance abuse including alcohol and other drugs,
- mental health and mental disorders,
- violent and abusive behaviors,
- unintentional injuries, and
- surveillance and data systems.

To that end, within each of these topic areas, the extent to which health disparities limited health gains within the population were explored. The focus on health disparities, informed also, the role of data and surveillance, as it became necessary to document differences in health status among unique segments of the population.

The additional category of data and surveillance was included to support the analysis of progress toward the national health goals. Efforts to support the data requirements of the national health goals and objectives were part of an ongoing process.
While progress had been made in meeting nearly 50 percent of the identified objectives, progress on nearly 25 percent of the objectives remained unclear (Mason & McGinnis, 1990). Limitations in data, documented since the initiation of Healthy People still presented a challenge. Importantly, focused attention on data and surveillance was included as a part of Healthy People 2000 as an additional category around which specific objectives and measures were identified.

To that end, in October, 1990 the first core YRBS survey was developed after a rigorous process of review and refinement by:

- federal and non-federal agency representatives,
- pilot testing with high school students in grades nine through 12, and
- a scientific panel of experts convened at workshops and national conferences.

The survey was administered among school-based youth for national, state, and local purposes. Consistent with previous surveillance efforts, the survey was implemented among national households targeting youth ages twelve through twenty-one year old, including those who may not be attending high school and those who were in college (Kolbe, Kann & Collins, 1993). A direct result of ongoing action to eliminate data limitations, the YRBSS was developed to broadly support the national health agenda promoted by the Healthy People Initiative as an epidemiologic surveillance system.

The original core YRBS was piloted in 1991 among nearly 14,000 ninth through twelfth grade students nationally (Kann et. al, 1993). Since that time additional components of the surveillance system have included administration among college, middle, and alternative school youth. At that time, the National Health Interview Survey
remained a part of national surveillance efforts and was conducted among households containing youth ages twelve through twenty-one (CDC, 2013). Middle, alternative, and collegiate level YRBS have been administered, but not broadly used or systematically integrated into the YRBSS at the national level. The middle school YRBS first was piloted in 1995 and repeated again in 1997 with 10% of states providing data that became part of a national aggregate profile (CDC, 2013). While implementation of the middle school YRBS has continued at a national level, since that time, the participation of states and subsequent availability of data at the middle school level has been comparatively less robust than that of the high school YRBS (CDC, 2013).

The national high school YRBS was administered in odd years beginning in 1991 through 1997 prior to the release of Healthy People 2010. The current national surveillance plan includes the administration of the YRBS among ninth through twelfth grade students in alternating years, in collaboration with state departments of health and education across the country. Moving beyond the administration of the YRBS, the provision of technical assistance to support survey administration at the state and local level has been of increasing focus (CDC, 2012). Since this time a robust and representative aggregate national profile of adolescent health risk behaviors has been developed biennially, based in large part on the integration and implementation of the YRBS at the state level. This progress toward addressing data and surveillance limitations had clear implications for the next iteration of Healthy People.

The development of Healthy People 2010 began in 1998 and was introduced in January of 2000. This iteration of the initiative supported two overarching goals related
to: increasing quality and years of healthy life, and eliminating health disparities. Approximately 467 objectives were developed to support health progress in 28 health priority areas. New to this version of the initiative was the identification of leading health indicators. A leading health indicator was defined as a “critical health priority” that if unaddressed would lead to ongoing public health problems in the future (DHHS, 2011). In this stage of the Healthy People agenda, substance use and tobacco remained among the priority areas. With the exception of the priority area focused on maternal, infant and child health, age groups categories were incorporated as objectives embedded within specific priority areas. Additionally, the identification of leading health indicators was included to better support the integration of the initiative at the community level. For example, among children, adolescents, and young adults the following leading health indicators were included within the priority area of substance use:

- Reduce tobacco use by adolescents.
- Reduce the proportion of children who are regularly exposed to tobacco smoke at home.
- Reduce past-month use of illicit substances.
- Increase the proportion of adolescents not using alcohol or any illicit drugs during the past 30 days.

New to this phase of the Healthy People initiative were subsidiary programs designed to highlight and provide guidance for unique populations and target groups for which additional efforts were warranted. To that end, in 2004, Improving the Health of Adolescents & Young Adults: Guide for States and Communities was released by the
United States Department of Health and Human Services. This guide provided support for states and communities toward progress on the 21 critical health objectives that were to be attained by 2010. Then Surgeon General and Administrator of the Health Resources Services Administration, Julie Gerberding, asserted that the guide “provides a framework for helping communities to establish priorities, take collective action, and measure progress toward the shared goal of improving the health, safety, and well-being of their adolescents and young adults (CDC, 2004, p. 4).”

Further, this document clarified national efforts related to improving adolescent health including:

- specific age-related objectives,
- data related to adolescent health risk behaviors, morbidity and mortality, and
- specific strategies and activities designed to improve and enhance adolescent health.

The guide provided resources to support assessment, program planning, evaluation, and sustainability of programming and related community interventions designed to support adolescent health. This supplemental approach was based on the identification of specific target populations more commonly affected by health disparities. Largely, this action was a response to shortcomings in Healthy People 2000, related to the inability to achieve more than 85 percent of the identified objectives and implementation challenges among states and communities (Cottrell et. al., 2006). Clearly, the inclusion of adolescents within the initiative was evolving, as efforts to make meaningful health gains within the population continued.
More than 1200 objectives and 42 topic areas support the four broad goals of *Healthy People 2020* including:

- Attain high-quality, longer lives free of preventable disease, disability, injury, and premature death.
- Achieve health equity, eliminate disparities, and improve the health of all groups.
- Create social and physical environments that promote good health for all.

These broad goals reflect an improved understanding of the extent to which environmental factors influence health. For that reason, the social determinants of health has had an increased presence within the initiative, as a mechanism through which health disparities may be addressed. Policymaking, social factors, health services, individual behavior, biology and genetics were categories included among the broad range of factors under which the determinants of health fell (DHHS, 2010). Social determinants of health had both an increasing presence within the overall initiative as well as designation as a new topic area within *Healthy People 2020*. Interestingly, within this era of the initiative, new topics areas were identified indicative of a renewed focus on specific lifespan categories. The emergence of age groups as a topic area as a part of the organization of the initiative emerged again, as evidenced by the identification of adolescents as a new topic area.
This new orientation and focus on adolescent health within the Healthy People agenda included a specific goal of “improving healthy development, health, safety, and well-being of adolescents, broadly defined as ages ten through twenty-four” (DHHS, 2010). Approximately 11 objectives related to adolescent health were identified including the following specific to substance use:

- Reduce the proportion of adolescents who have been offered, sold, or given an illegal drug on school property.
- Reduce adolescent and young adult perpetration of and victimization by crimes.

An additional topic area of interest related to early and middle childhood was also introduced as part of Healthy People 2020. Combined with the topic area for adolescents, the full spectrum of child development had been restructured within the Healthy People initiative. The importance of middle childhood as a critical developmental phase, independent of issues consistent with what has been traditionally referenced as maternal, infant, and child health is an important distinction. Interestingly, there is overlap among the definitions of middle childhood and adolescence, defined as ages 6 to 12 and 10 to 19 respectively.

Schools have been considered an essential partner in achieving the broad national health goals since the beginning of the Healthy People initiative. To that end, education both as an influential setting and an essential strategy has been important in achieving health gains, particularly among the adolescent population. In light of increasing evidence supporting the relationship between health and academic learning, for the first
time an objective related to academic achievement was included within *Healthy People 2020*: increase the educational achievement of adolescents and young adults. This objective will be measured by the following specific measures:

1. Increase the proportion of students who graduate with a regular diploma 4 years after starting the 9th grade.
2. Increase the proportion of students who are served under the Individuals with Disabilities Education Act who graduate high school with a diploma.
3. Increase the proportion of students whose reading skills are at or above the proficient achievement level for their grade.
4. Increase the proportion of students whose mathematics skills are at or above the proficient achievement level for their grade.
5. Increase the proportion of adolescents who consider their schoolwork to be meaningful and important.
6. Decrease school absenteeism among adolescents due to illness or injury.

Because of its designation as a leading health indicator, of specific interest is the objective related to students graduating with a diploma in 4 years. Interestingly, data specific to this and several of the other objectives has been broadly available at the local, state, and national level for many years. As an example, data related to graduation rates, absenteeism, and student proficiency in multiple content areas is available through the website of the Ohio Department of Education as far back as the 2005-2006 academic year, and earlier upon request (ODE, 2013). The incorporation of educational outcomes, however, is a new component of the Healthy People initiative. Moving forward, data
related to these specific objectives will be compiled at the national and state level, integrated as a part of the initiative, and inform future policy and public health action; including the development of the next generation of the Healthy People.

While the treatment of adolescents as a new topic area and the incorporation of new education specific outcomes had been incorporated as a part of Healthy People 2020, substance use remained a topic area. Approximately 21 specific objectives were included for this topic and were divided based on their relevance to policy and prevention, screening and treatment, and epidemiology and surveillance. A number of the primary objectives in the category of policy and prevention, included as a part of this topic area, pertain to adolescents including (DHHS, 2011):

- Reducing the rate of reported driving in a car with someone who had been drinking within the last 30 days.
- Increasing the report rate of adolescents reporting never using substances.
- Increasing the reported rate of adolescents who disapprove of substance use
- Increasing the reported rate of adolescents who perceive great risk associated with substance use.

Several secondary objectives incorporate an explicit focus on adolescents, particularly among those contained within the category of epidemiology and surveillance including those specific to: reductions in current illicit substance use, and engagement in binge drinking. Additionally, adolescents are implicitly incorporated as a part of other objectives within the category as it relates to screening and treatment related to admissions and referrals.
Tobacco use is considered a topic area as a part of Healthy People 2020, independent of the identified topic area of substance use. To that end, objectives within this category are organized around the concepts of tobacco use, healthy systems change, and social and environmental changes (DHHS, 2011). Within the topic area, specific actions for targeted segments of the population were identified, including among adolescents. The primary objectives specific to adolescent tobacco use were related to reductions in both the initiation and prevalence of tobacco use among adolescents. Secondary objectives were inclusive of adolescents specific to screening and cessations within the health care settings focused on health systems change. Among actions focused on social and environmental changes, adolescents were included as part of a primary objective related to tobacco advertising. Within this same area of focus, adolescents were included as secondary objectives for (DHHS, 2011):

- exposure to non-smoking;
- prohibition of smoking in public places, houses, and other locations where adolescents may be;
- stronger tobacco control laws;
- reductions in illegal sales to minors; and
- integration of tobacco control policies.

While the Healthy People initiative has grown and data collection needs have been enhanced, so too have the mechanisms designed to support the related data collection. Over time, and consistent with changes in the identified goals, objectives, and priority areas of the Healthy People Initiative, additional items have been added or
provided as optional modules for inclusion on the YRBS (CDC, 2004). Accordingly, additional modules or scales have been developed for inclusion to allow for the collection of data related to new objectives. While the core of the YRBS instrument has maintained a focus on risk behaviors, modules containing specific items about protective factors as well as attitudes and perceptions have had an increasing presence.

Additionally, the CDC has developed a guide for local, state, and regional surveillance efforts to assist in the administration of the YRBS. Included in the guide are instructions for obtaining consent, sample permission slips, survey administration procedures, and guidelines for survey administration within the school setting (CDC, 2012). The CDC’s website has become an essential toolkit of resources for broad use and dissemination of YRBSS related data and implementation guidance. Efforts to support regional, state, and local YRBSS administration supports the sampling methodology associated with the national survey. This national sampling strategy has increasingly relied on states and local school districts to implement the YRBS as part of an aggregate national sample. Cooperative agreements with state departments of health and education, as well as other public and private partnerships, contribute to the ability of the YRBS to be widely implemented in school districts across the country.

**Surveillance Efforts at the Local Level**

Since 2001, Case Western Reserve University (CWRU) has annually administered the YRBS among school districts in northeastern, Ohio. This effort has been predicated on the county structure of the state of Ohio with a unique focus on Cuyahoga County. Cuyahoga County, Ohio encompasses:
• the city of Cleveland, the regions urban center;
• all inner ring suburbs with which the city of Cleveland is adjacent and shares a border; and
• all outer ring suburbs, remaining municipalities that share a border both with an inner ring suburb and the boundaries of Cuyahoga County, Ohio.

The convergence of multiple factors spurred the initiation of this effort including (PRCHN, 2013):

• state level surveillance efforts in support of national data collection,
• evaluation of specific state and countywide child and adolescent health initiatives,
• local planning processes related to coordinated school health, and
• influx of new funding with specific mandates for the evaluation of community-based, prevention strategies targeting adolescents.

Overtime, based on a comprehensive and strategic plan, these surveillance efforts have been sustained. The evolving support of a diverse and comprehensive array of partners has been maintained and been an essential component of this local data collection process. Combined, over the course of a more than 12-year period, a unique repository of data has been developed that profiles the health of adolescents across the region.

Among the ongoing sponsors of this local surveillance effort, have been multiple community anti-drug coalitions, funded at the federal level through the Drug Free Community (DFC) Grant Program. The DFC Grant Program has supported substance use prevention efforts of community coalitions across the country since 1997, resulting
from an amendment to the National Narcotics Leadership Act of 1988. This amendment created the Drug Free Communities Act (DFCA) and subsequent DFC Grant Program. The DFCA was designed to “establish a program to support and encourage local communities that demonstrate a comprehensive, long-term commitment to reduce substance abuse among youth” (Congressional Record, 1997, p 2). The legislation allowed for eligible community coalitions to competitively apply for federal funding to work towards the following broad goals (DHHS, 2009, pg. 5):

1. “Establish and strengthen collaboration among communities, public and private non-profit agencies, and Federal, State, local, and tribal governments to support the efforts of community coalitions working to prevent and reduce substance use among youth.

2. Reduce substance use among youth and, over time, reduce substance abuse among adults by addressing the factors in a community that increase the risk of substance abuse and promoting the factors that minimize the risk of substance abuse.

To achieve these goals, coalitions engaged in the development of objectives for 7 broad environmental strategies related to substance abuse prevention including (CADCA, 2009):

1. Providing educational information to increase knowledge and awareness.

2. Improving and enhancing skills through individual and organizational capacity building.
3. Providing pro-health and pro-social opportunities within the broad environment.

4. Enhancing access to and reducing barriers related to engagement.

5. Changing related consequences through incentivizing and dis-incentivizing.

6. Changing the physical and environmental structure to reduce risk and enhance protection.

7. Modifying and changing related policies.

The identification and implementation of related actions has varied depending on the specific purpose and function of the coalition. The Strategic Prevention Framework (SPF), regardless of the distinct strategies employed by individual coalitions, has been the framework that supported the identified strategies of all DFC funded coalitions. The SPF is an evidence-based planning model within which both cultural competency and sustainability were embedded. The five phases of the model include assessment, capacity building, planning, implementation, and evaluation (CADCA, 2007). Specific to the phase of evaluation, efforts for both coalition and national evaluation requirements needed to be addressed. While there has been variability in coalition specific evaluation criteria based on the selection and identification of strategies, all funded coalitions were required to obtain specific data to support the national evaluation requirements.

The DFC grant, as with other federal funding, has clearly defined outcomes as required by the Government Performance and Results Act (GPRA). GPRA is a federal statute that requires periodic reporting of performance data to ensure accountability and
transparency in the use of public funds. The following four GPRA measures have been reported by all DFC funded coalitions on a biennial basis:

- past 30-day use,
- perception of risk or harm,
- perception of parental disapproval of use, and
- perception of peer disapproval of use.

For every DFC funded coalition, data was to be obtained for alcohol, tobacco, marijuana, and prescription drug use for at least three grade levels between the sixth and twelfth grades.

In compliance with this mandate, several DFC funded coalitions within the greater Cleveland area have collaborated with CWRU to collect data with the YRBS. Beginning in 2001, administration of the YRBS occurred among high school students in inner ring suburbs of Cleveland, Ohio. In every subsequent year, YRBS administration has occurred in this region among specific school aged populations including public, private, and charter middle and high schools within Cuyahoga County. Survey administration has been supported by the technical assistance and online support of the CDC, with funding to support ongoing surveillance coming for a number of federal, state, private, and local funding sources, including DFC funding (PRCHN, 2013). These efforts have contributed, in part, to both the aggregate report of both state and national YRBSS efforts.

Accordingly, in addition to standard items on the YRBS instruments related to youth substance use, items that allowed for the collection of data related to the required
national evaluation of DFC coalitions as well as parental permissiveness, school climate, and protective factors. The addition of these items has been consistent with national trends in modifications to the YRBS. This heightened focus on data related to youth substance use has allowed for the development of a robust pool of data designed to support related prevention and environmental efforts at the local level. Importantly, as federal and state funding has threatened the continuation of the DFC program, the Community Anti-Drug Coalitions of American (CADCA) has encouraged advocacy and related policies to support ongoing funding. CADCA is a national organization of more than 5,000 community coalitions that, since 1992, has focused on reducing and preventing youth substance use in communities across the United States. CADCA has identified the relationship between youth substance use and academic achievement as an advocacy and policy priority based on related data including a link between (CADCA, 2013):

- youth substance use and poor academic achievement,
- peer substance use and lower reading and math scores, and
- provision of social and emotional learning programs and increased academic achievement.

Further demonstrating the relationship between youth substance use and academic achievement will be essential to supporting ongoing DFC programming and is consistent with national advocacy and policy priorities of CADCA. The position of CADCA with respect to leveraging the relationship between health and academic achievement as the
rationale for continued funding is consistent with the evolution of the Healthy People initiative, and the inclusion of distinct objective in *Healthy People 2020.*

Since 2001, YRBS surveillance activities have transitioned within CWRU from the Center for Adolescent Health, to the Center for Health Promotion Research, and most recently the Prevention Research Center for Healthy Communities (PRCHN) in 2009. The PRCHN is one of more than thirty-five CDC funded Prevention Research Centers dedicated to addressing the impact of chronic diseases in urban communities (CDC, 2013). Throughout this time, a regional surveillance plan that allowed for YRBS administration among middle or high school students in alternating years. The most recent YRBS core survey developed and revised by the CDC was exclusively utilized, with additional items related to specific funding requirements or regional trends in health behaviors for which additional data was requested. Annual surveillance utilizing the YRBS remained as one of the core functions of the PRC, with implementation of the survey among youth within Cuyahoga County in northeastern Ohio.

Collaborative efforts toward local surveillance efforts have allowed for the collection of data from youth across Cuyahoga County, Ohio for more than a decade. During this time, there have been coalitions within the greater Cleveland area funded by the DFC grant. While the core YRBS survey has been used as the basis for survey administration, the need for specific local data has allowed for the inclusion of additional items related to youth substance use as part of the evaluation of local community anti-drug coalitions. In 2012, the inclusion of questions related to broad youth substance use
and academic achievement occurred as part of the YRBS administration of middle school aged youth in Cuyahoga County Ohio. Analysis of this data will:

- allow for continued monitoring and support of local efforts to improve and enhance the health of adolescents;
- build upon the limited research related to the health risk behaviors of middle school aged youth;
- support the national advocacy and policy agenda to support continued Drug Free Community Grant programming; and
- add to the growing body of evidence supporting the relationship between health and academic achievement.

The Purpose of the Study

The purpose of this study was to examine the relationship between substance use, selected demographics and academic achievement among middle school aged youth in an urban Midwestern county.

Research Questions

The research questions associated with this study are: grounded in a thorough review of the literature; and centered around preliminary data detailing the prevalence rates of substance use among middle school aged youth, detailed in the 2012 Cuyahoga County Middle School Youth Risk Behavior Survey Report.

Research Question 1: Is there a significant relationship between selected demographic characteristics and academic achievement in middle school aged youth?
The selected demographic characteristics will include self-reported grade level, sex, race and socioeconomic status.

Research Question 2: Is there a significant relationship between selected demographic characteristics and self-reported substance use in middle school aged youth? The selected demographics characteristics will include self-reported grade level, sex, race and socioeconomic status. Self- reported use of tobacco, alcohol, and marijuana use will be used to approximate substance use.

Research Question 3: Is there a relationship between self-reported academic achievement and lack of substance use among middle school aged youth? Self- reported use of tobacco, alcohol, and marijuana use will be used to approximate substance use.

Research Question 4: Is there a difference in academic achievement among middle school students self-reporting different types of substance use? Self- reported use of tobacco, alcohol, and marijuana use will be used to approximate different types substance use.

Research Question 5: Is there a difference in academic achievement among middle school students self-reporting different patterns of substance use? Patterns of substance use are based on self-reported never, ever, or current use of alcohol, tobacco and/or marijuana.
CHAPTER II
LITERATURE REVIEW

The Purpose of the Study

The purpose of this study was to examine the relationship between substance use, selected demographics and academic achievement among middle school aged youth in an urban Midwestern county.

Adolescence

Adolescence has been defined by the Society for Adolescent Health and Medicine (2013), as a “time of dramatic changes in a young person's life; and a challenging stage of human development during which pre-teens, teenagers and young adults experience physical, intellectual, emotional and social maturation.” Often identified as the beginning of the second decade of life, there are differing opinions about the orientation and exact range of the human lifespan that qualifies uniquely as adolescence.

In the 1979 Surgeon General’s Report on Health Promotion and Disease Prevention youth ages 15 to 24 were categorized as adolescents and young adults. Within this report there was no further delineation of the specific definition or age range for adolescents. As a document that identified specific objectives to meet the goals set out in the 1979 report, the 1990 Health Objectives for the Nation maintained a similar orientation to the treatment of adolescents. This orientation was maintained in both Healthy People 2000 and Healthy People 2010. Notably, Healthy People 2020 broadly has identified adolescents to include youth and young adults between the ages of 10-24.
Over time, as a part of the Healthy People initiative, the boundaries of the lifespan category of adolescence has been broadened, including this maximum possible age range.

Variability in the categorization within the lifespan category of adolescence has evolved to the current definition, including:

- both adolescents and young adults;
- young adolescents, adolescents, and young adults; and
- adolescents and young adults with the identification of a separate yet overlapping category referenced as middle childhood, ages 6-12.

At this time, among leading national organizations and federal entities engaged in work with youth, the differentiation of early adolescence (ages 10-14), late adolescence (ages 15-19), and young adults (ages 20-24) appear to be the most commonly cited orientation of the lifespan category (DHHS, 2010).

Despite the challenges in defining the discrete boundaries of adolescence, there has been consensus among leading health organizations including the Society for Adolescent Health and Medicine (SAHM), the Institute of Medicine (IOM), and the Centers for Disease Control and Prevention (CDC) confirming adolescence as a critical formative period. The transitional nature of adolescence has been based largely on its role as a key developmental phase. Chronologically, adolescence bridges childhood and adulthood. What occurs during this period includes a myriad of physical, mental, social, and emotional development. All such transitions occur in the context of an ever-changing social and environmental landscape. The process of self-discovery and increased
independence associated with this developmental stage provides both unique
opportunities and vulnerabilities for adolescents.

It is during this period of change that lifestyle behaviors are learned, influencing
both current and future health status. The patterns of behaviors, established during
adolescence, make engagement in risk behaviors during this time to likely influence
morbidity and mortality in adulthood (National Research Council and Institute of
Medicine, 2009; DHHS, 2010). For this reason, delaying the onset and initiation of risky
behaviors assumes a prominent role in programs targeting youth. A preventive
orientation, especially related to averting engagement in risk behaviors, to addressing the
health of adolescents has been historically and consistently included as a part of the
national public health agenda, Healthy People. To that end, related programs and
policies that support the healthy development of youth universally have addressed the
initiation of problematic behavior, decreasing health damaging behaviors, and increasing
health-enhancing behaviors among those who are at an increased risk (DHHS, 2004).
Overtime, these efforts have contributed to improvements in adolescent health. This is
due, to some extent, on the targeted gathering of data related to the health status of
adolescence and progress in evidence-based programs and policies that broadly support
the healthy development of youth.

Advances in the understanding of adolescence and adolescent health have
occurred, in part, as a function of initiatives developed by federal, foundations, and
professional organizations. Despite the sometimes pessimistic perception and portrayal
of youth, a number of seminal reports have been commissioned and dedicated to
exploring this complex phase of life. Combined they have contributed to (Carnegie Council on Adolescent Development, 1995; National Commission on Children, 1993; National Research Council and Institute of Medicine, 2009; Kellogg Foundation 1998):

- an understanding of the manner in which social and environmental context influences the lives and health of adolescents;
- the identification of models to support the development of assets and strengthening of deficits in youth; and
- research informing the development of evidence-based practices for the healthy development of youth.

These advances have engendered further support by the availability of national datasets that provide a robust and comprehensive profile of adolescent health. There have been broad and historic limitations in health data as evidence by the focus on data surveillance as a consistent component of the Healthy People Initiative. Adolescents, however, as a vulnerable population have been further limited by data (Irwin, Scot, Burg & Cart, 2002):

- being combined with other age categories or responses for youth coming from parents or guardians;
- inadequacies such as the differentiation between race, ethnicity, and socio-economic status;
- collected primarily as cross-sectional, limiting the ability to monitor trends over time; and
that are behavioral specific, without information about health service utilization.

The study of adolescents and their health is now a robust discipline, rooted in an evidence-based understanding of the complex challenges associated with this transitional phase of human development.

There are currently nearly 60 million adolescents ages 10 through 24 in the United States, representing approximately 21% of the population (DHHS, 2011). Despite an increase in the overall adolescent population between the administration of the 2000 and 2010 Census, the number of adolescents as a proportion of the total population has remained unchanged. Further, the proportion of youth falling within the categories of early adolescence, late adolescence, and young adults were somewhat evenly divided, with early adolescents being the smallest proportion of the population at 32% (US Census Bureau, 2012). While there was limited variability among the different age groups within the category of adolescents, there was considerable racial and ethnic diversity within the group. Consistent with the history of ethnic and racial change within the United States, each successive generation has been increasingly diverse. The same was true for this generation of adolescents, among whom nearly 60% are Caucasian, 19% are Hispanic, 15% are African American, and 4% are Asian (US Census Bureau, 2012).

**Adolescent Health and Development**

Adolescence involves a complex set of developmental milestones. In *Understanding Adolescence*, Perkins identified eight developmental tasks adolescents must encounter as they transition into adulthood including:
1. achieving a new and more mature relations with others, both boys and girls in one’s age group;
2. achieving a masculine or feminine social role;
3. accepting one’s physique;
4. achieving emotional independence from parents and other adults;
5. preparing for marriage and family;
6. preparing for an economic career;
7. acquiring a set of values and an ethical system as a guide to behavior; and,
8. desiring and achieving socially responsible behavior. (Perkins, 2009, pg.2-4)

These developmental tasks recognize the biological, social, physical, and emotional changes that youth must navigate. Importantly, as youth age and gain increasing independence, social and environmental context plays an increasing role in their normative behavior and development. Media, popular culture, and technology are among the environmental factors of influence as adolescents attempt to “fit in”, the primary mechanism guiding youth conduct and social norms (Frank & Knight, 2009).

The physical changes associated with adolescent development often are the most apparent. These changes occur at an ongoing and frequent pace, similar to that which occurs during infancy (Ruffin, 2009). There are also significant biological and physical changes occurring in the adolescent brain. Developments in portions of the brain responsible for impulse control, management of emotions, and decision-making, during adolescence, are influenced by extensive cognitive changes taking place within fundamental segments of the brain (McNeely & Blanchard, 2009). Essentially,
adolescents are both learning to make decisions and developing decision-making capability simultaneously. Evidence suggests that development of the brain begins at birth, peaks in the processing of information at age 12, but lasts through approximately age 24 (Ruder, 2008). Continued brain development during this age range provides further support for the extended length of the lifespan category of adolescence. From an ecological perspective, these physical and cognitive changes occurring during adolescence: contribute to their overall health status and engagement in health behaviors; and provide insight into potential areas of action to influence behavior change.

In a 2010 publication titled *Drugs, Brains, and Behavior: The Science of Addiction*, the National Institute on Drug Abuse (NIDA) detailed research and advances in the understanding of addiction and its effects on both the brain and behavior. The ability of drugs to alter both the structure and function of the brain in immediate and long lasting ways is one of the underlying findings of the text. Among adolescents, the authors cite poor academic performance, graduation rates, unplanned pregnancies, violence, and infectious diseases among those who are drug abusers (NIDA, 2010). There are also clear implications for the impact of substance use among youth within the educational setting. Impairment to cognitive functioning of the brain is likely to also influence an adolescent’s ability, readiness, and motivation to learn (Wolfe, 2010).

 Appropriately, adolescent development is not limited to the influence of individual, genetic and biological factors of influence. Advances in the understanding of adolescent development have mirrored fundamental transitions in public health, specifically those related to the relationship between the environment and health. To that
end, the influence of the environment in the lives of adolescence has had an increased focus. Consistent with this approach, the current *Healthy People 2020* action model details the assessment, monitoring, evaluation, and dissemination process that will lead to achieving the identified overarching goals. Key to this process has been the identification of (DHHS, 2010):

- Interventions, specifically policies, programs and information;
- Determinants of health at the individual, interpersonal, and broad environmental levels; and
- Outcomes for behaviors, diseases, quality of life and health equity.

The action model described the environmental factors of influence as the “broad social, economic, cultural, health and physical conditions and policies at the global, national, state, and local levels (DHHS, 2010). The complex interaction between the individual and the environment has been described as social ecology.

Stokals (1996) described the social ecology and the social ecological model as a function of this interaction, defined by multiple factors and layers of influence. These factors and layers of influence included (DHHS, 2008):

- Individual behaviors influenced by demographic and biological characteristics;
- Interpersonal behaviors influenced by social, family, school, and community networks; and
- Environmental behaviors influenced by broad social, economic, cultural, and health conditions and policies.
Accordingly, a combination of personal, interpersonal, and environmental forces coalesce as a part of the social ecological framework that influences health, including the health of adolescents (Stokols, 1992).

Consistent with the social ecological model, the dynamic interaction of adolescents and their environment has been documented as (DHHS, 2004):

- where the initiation or development of health behaviors that might continue into adulthood occurs;
- largely influenced by personal characteristics and relationships with both parents and peers; and
- reflective of a broad social environment including school, family, and community.

This social ecological perspective further supports the complexity of adolescent development and the confluence of factors and forces that contribute to the health of young people (McLeroy, Bibeau, Steckler, & Glanz, 1988).

Importantly, health falls within the environmental sphere of influence identified as a part of the social ecological model. The determinants of health have been categorized as: biology and genetics, individual behaviors, health services, social factors, and policymaking (DHHS, 2010). Essentially, this critical combination of environmental factors contributes significantly to the health of the population. Fielding (2009) identified the social environment as a determinant of health formally defined as: the” aggregate of social, economic, and cultural institutions, norms, patterns, beliefs and processes that influence the life of an individual or community (pg. 14).” To that end,
there is evidence to confirm that early life experiences, social support, and stress are among the social determinants of health influencing the lives of adolescents (Marmot, 2005). Navigating developmental milestones within this dynamic social environmental landscape confirms adolescence as “a time of opportunity, not turmoil” (McNeely & Blanchard, 2009, pg. 2; Mulye et. al, 2009).

Both parents and peers represent meaningful interpersonal relationships within the lives of adolescents. They are the primary social networks and mechanisms of social support in the lives of youth. This is further supported by the inclusion of social, family, and community networks as a part of the interpersonal domain of the Healthy People 2020 action model (DHHS, 2010). During adolescence, however, there is a shift in primary affiliation from parents to peers, based on an evolving and often increased level of autonomy and maturation (Frank, 2007). With attention to the interpersonal realm of the social ecological model, the development of general social and peer resistance skills among adolescents constitutes an essential component of adolescent development. The development of these skills promotes health-enhancing behaviors and protects adolescents from related risks. Youth who fail to adopt these skills have an increased likelihood of engagement in problem behaviors (Hawkins & Catalano, 1992). While the social environment within which adolescents live influences their behavior, it has both a protective and non-protective impact.

The CDC (2013) defined a protective factor as “individual or environmental characteristics, conditions, or behaviors that reduce the effects of stressful life events.” Protective factors are present within all social ecological levels in the lives of youth.
That is, a combination of pro-health and pro-social personal, interpersonal, and environmental factors, influence adolescent health and behaviors. This same combination of factors can have a non-protective impact, and are commonly referenced as risk factors or risk behaviors. The World Health Organization (2013) defines a risk factor as “any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury.”

The impact of both risk and protective factors in the lives of adolescents has a cumulative effect. This effect is based both on the presence of these factors over time as well as the number of factors present at any given time. Further, during a specific point in time, exposure to multiple risk factors increases the likelihood of a negative outcome, as does an imbalance in risk and protective factors (Rutter M, 1979; Resnick 1997). Youth can, however, overcome the presence of multiple risk factors if there are adequate protective factors present within their lives.

Resnick (2000) described both risk and protective factors as bipolar constructs on opposite ends of a continuum. On one end are protective factors (pg. S12) defined as “events or experiences that reduce the likelihood of negative outcomes and increase the likelihood of positive outcomes.” On the other end of the continuum are risk factors defined as “elements and experiences in childhood or adolescence that increase the likelihood of negative outcomes and decreases the likelihood of positive outcomes (pg. S12).” Within this spectrum, the impact of the effects of both risk and protective factors are cumulative, such that multiple exposures over time (Rutter M, 1979; Masten AS, Wright & MOD, 1998):
- increases the likelihood of a negative outcome when associated with risk factors; and
- increases likelihood of positive outcomes when associated with protective factors.

Despite this orientation, Bernat and Resnick (2006) identified the following similarities between risk and protective factors:

- they can occur at all levels of social ecological influence;
- the effects are not consistent across social groups;
- they can co-occur or cluster
- they can be intrinsic or extrinsic to an individual.

Importantly, the *Risk and Protective Factor Framework* was developed by Hawkins, Catalano, and Miller (1992). It characterized the manner in which the presence of risk factors across multiple domains increases the likelihood of a negative outcome and engagement in problem behaviors. This framework was based on explanatory theories from the field of criminology, which suggested that control, social learning and differential association combined to promote learned behavior and social development in youth.

By contrast, engagement in healthy behaviors is supported through a process of:

- cognitive and behavioral opportunities that allow for the development of skills and recognition;
- pro-social bonding through attachment and commitment; and
the development of healthy beliefs and clear and consistent standards of behavior (Hawkins, et. al, 1994).

In the life of an adolescent, the presence of protective factors serves as a buffer or barrier, moderating the negative characteristics or influence of risk factors within the environment. The prevention of adolescent engagement in health-risk behaviors has been demonstrated to be influenced directly by strengthening of protective factors (Hawkins, et. al, 1999). In order to promote health-enhancing development and prevent engagement in problem behaviors, it is important to address those factors that are known to predict high-risk behaviors.

It is possible, however, for adolescents to overcome, rebound, and recover from various degrees of risk exposure and engagement through actions characterized as resilience. Resilience is defined as the process in which individuals show positive outcomes, despite adversity (Bernat & Resnick, 2006, pg. S11). Research examining resilience among youth began in the 1960’s and 1970’s. This research sought to explore the characteristics of invulnerable youth. What is now known about resilience confirms that it is a more common trait among all youth and less a specific trait to a unique segment of the adolescent population. Resilience is a process that demonstrates adaptability and competence in the presence of risks or stressors (Braverman, 2001). Resilience theory provides a framework for social support and engagement with youth through (Bernard, 1991):

- providing opportunities for meaningful participation;
- increasing pro-social bonding;
- setting clear, and consistent boundaries;
- teaching life skills’
- providing care and support;
- setting and communication high expectations.

Resilience is dynamic process and pattern of behavior that is not present in all situations that occur within the lives of youth. A young person can demonstrate resilience in response to specific environmental threats, but not others.

In this context, resilience is an essential component of positive youth development (PYD), a strengths-based approach that supports the successful development and preparation of young people to adulthood (Henderson, Bernard, & Sharp-Light 2007). Reflective of a systems theory approach similar to the social ecological model, PYD represents a holistic approach to adolescent development incorporating all levels, contexts, and environments that influence the lives of adolescents (Lerner, 2009). It is well documented that health outcomes among adolescents and young adults are influenced by their social environments and frequently mediated by their behaviors (DHHS, 2001, pg. 2).” For this reason, recognition of the broad environmental factors and interpersonal relationships among family, peer group, school, neighborhood and community provide support for the challenges of transitioning through and working with adolescents.

Comprehensive programming in school, faith, and community organizations has been demonstrated to support the healthy development of youth. PYD programs have been generally characterized as promoting pro-health and pro-social skills and abilities
through exposure, engagement, and empowerment opportunities (Roth & Brooks-Gunn, 2003). Bernat and Resnick (2006, pg. S10) define PYD programs as “the deliberate process of providing all youth with the support, relationships, experiences, resources, and opportunities needed to become successful and competent adults.” Notably, Healthy People 2020 has identified the need for PYD programs as an emerging issue in adolescent health (DHHS, 2010). The implementation and evaluation of PYD programs will allow for development of evidence-based PYD programs. A comprehensive review of PYD programs identified the following broad programmatic objectives (Hawkins et.al,2004, 101-102):

- promotes bonding;
- fosters resilience;
- promotes social competence;
- promotes emotional competence;
- promotes cognitive competence;
- promotes behavioral competence;
- promotes moral competence;
- fosters self-determination;
- fosters spirituality;
- fosters self-efficacy;
- fosters clear and positive identity;
- fosters belief in the future;
- provides recognition for positive behavior;
• provides opportunities for pro-social involvement;
• fosters pro-social norms;

These essential components of PYD have effectively been implemented to reduce and prevent a broad array of health behaviors. Such programs are implemented in school, community, and faith –based settings and seeks to better and positively connect youth to the environments in which they live.

The history of PYD stems in large part from research within the field of resiliency. More specifically, the concepts of reducing risks and enhancing protection were identified as being essential components of resiliency in youth (Rutter, 1993; Resnick, 2005). Importantly, resiliency previously has been cited as being a function of the dynamic interplay of risk factors, protective factors, and healthy youth development. For this reason, PYD programs are largely resiliency based and include the following skills and competencies (Search Institute, 2006; Resnick, 2000):

• interpersonal support, including clear and consistent boundaries and expectations, from family, adults, schools, and community;
• engagement in pro-health and pro-social opportunities in school, faith, and community based settings;
• motivation, engagement, and bonding related to learning and academic achievement;
• development of peer resistance and general social skills;
• sense of self, purpose, and optimism for the future including a moral and value system inclusive of responsibility and accountability.
Threats to the healthy development of youth are present across all social ecological domains. Personal, family, and peer group characteristics as well as the qualities of the schools and communities with which they are engaged influence the health and behavior of adolescents. Support for broad youth programming, an essential component to adolescent development, is further supported by the incorporation of numerous related objectives in *Healthy People 2020* including: increasing the proportion of adolescents who participate in extracurricular and out-of school activities; and increasing the proportion of adolescents who have an adult in their lives with whom they can talk about serious problems. While school, community, and faith-based settings are the primary locations in which youth programming occurs, the primary function and processes of the schooling enterprise set these institutions apart as a distinctive point of intervention related to adolescent development.

**Adolescent Health and Health Risk Behaviors**

What is known about adolescents and the influence of their engagement in health risk behaviors stems, in part, from documented progress toward the identification and reduction of the leading causes of morbidity and mortality in the United States. The seminal work of McGinnis and Foege (1993) and Mokdad et. al. (2000) confirmed the leading causes of death resulted primarily from preventable causes including tobacco use, poor diet, and lack of physical activity. With both medical and public health advances, the management and treatment of chronic diseases and conditions has improved both length and quality of life (CDC, 1999). Targeted efforts related to reductions in behaviors that lead to these chronic diseases and condition associated with poor health
outcomes contributed to these public health successes. Nearly two-thirds of all death among adolescents are the result of unintentional injury, suicide, and homicide (CDC, 2010). Fittingly, as the nation continued to confront the impact of chronic diseases, adolescence has become targeted as an essential intervention point.

Delaying the onset, initiation and maintenance of unhealthy behaviors is at the core of prevention (Anderson & Horvath, 2004). Cohen, Chehimi, and Chavez (2010) described the spectrum of prevention as moving beyond individual knowledge and education, using an ecological approach to address:

- community education,
- educating providers,
- fostering coalitions and networks,
- changing organizational practices, and
- influencing policy and legislation,

This prevention paradigm has been duly noted as the focus of the national public health agenda since the late 1980’s, as have the challenges associated with improving the relative rates of morbidity and mortality in youth. Healthy People 2020 identified the following goal for the topic area of adolescent health: “To improve the healthy development, health, safety, and well-being of adolescents and young adults (DHHS, 2011). Health gains within this population have fluctuated and been challenging to maintain. For these reasons, adolescents and prevention are a likely pairing. More specifically, national efforts targeting reductions in the burden of chronic diseases and conditions have sought to identify and address the contributing lifestyle and behavioral
factors among youth. Combined these preventive efforts have furthered collective knowledge about effective preventive measures and contributed to meaningful health improvements within the adolescent population.

Key to these health gains among adolescents, were the identification, understanding and organization of the key areas in which the health of the adult population were poor. The rationale supporting this approach was based on the identification of: the leading causes of morbidity and mortality in adulthood, and the lifestyle and behavioral factors that contributed to these diseases, conditions, and deaths. To that end, the CDC has identified six categories of behaviors that contribute to the leading causes of morbidity and mortality in the United States. These previously identified categories are commonly referred to as the CDC6 and include behaviors that:

- do not occur in isolation;
- often cluster;
- are preventable;
- are primarily developed during adolescence; and
- have the potential for life long consequences (Gil, Vega, & Turner, 2002).

As such, an essential component of adolescent health efforts has been a focus on risk reduction, the targeting of behaviors leading to the leading causes of morbidity and mortality (Kolbe, Kann, & Collins, 1993). Additionally, and consistent with the current evolution in public health practice, the social climate and social determinants of health have been increasingly identified as contributing to the health of the population.
At the federal level, the School Health Branch (SHB) of the CDC, formerly DASH, currently serves as a national resource for adolescent and school health, taking a leadership role in federal school health initiatives. Recent reorganization and prioritization of efforts at the CDC has contributed to the refined mission of SHB to more specifically address issues related to the prevention of HIV, STI’s, and teen pregnancy among adolescents. As such, a new School Health Branch (SHB) of the CDC was announced in 2012 as part of the Division of Population Health, with an explicit focus of school based prevention and health promotion related chronic disease. To that end, research, policies, and programs related to the relationship between health and learning specifically exploring health risk behaviors, school connectedness, and parental monitoring of youth and their influence on academic achievement are among the primary activities supported by SHB.

**Schools as Partners in Adolescent Health**

Since the founding of the United States in the 17th century, the majority of young people, have grown up spending extensive time within the school setting. Essentially, since the historic beginnings of the United States, schools have had a prominent role in the lives of young people. Because of their sustained relationship and contact with youth, schools provide an ideal setting to improve and enhance efforts related to adolescent health. The extensive and consistent collaboration between the systems of education and health has been largely characterized by the provision of non-educational support services within the school setting (Carlson, Paavola & Talley, 1995). Schools primarily seek to address the educational needs of youth. There is, however, an extensive history of
collaboration between schools and health and social services agencies. This historic collaboration dates back prior to the beginning of the twentieth century. The basis of this historic relationship stems from the provision of non-educational support services within the school setting (Tyack, 1992). Often as a part of larger educational and social reform, health and social service agencies have maintained a consistent, yet varied, presence within the educational setting.

*In Schools & Health – Our Nation’s Investment*, The Institute of Medicine (1997) chronicled a variety of social and political factors that have contributed to the presence of health related services within the school setting including:

- seminal historic events such as war and economic conditions;
- federal initiatives and policy mandates; and
- strategies and activities of national organizations related to either education or health.

This IOM report was written by the Committee on Comprehensive School Health Programs, a body commissioned to develop a framework for engagement of schools and health. Appropriately the committee based their study on the following assumptions:

1. The purpose of schools is to educate.
2. Education and health are related.
3. Youth have certain basic needs.
4. Schools have the potential to be a resource for the provision of these basic needs.
These four assumptions succinctly summarize the history of schools and health.

Variation in the role of health within the educational setting can be chronicled historically through the evolution in public health. Three broad categories of emphasis have occurred within modern public health history based on a shift in focus from: infectious diseases; to lifestyle and behavioral patterns; and, more recent focus on ecological and systems level approaches (Kickbush & Payne, 2003).

The Report of the Sanitary Commission of the State of Massachusetts (1850) is commonly cited as one of the most influential public health documents in the history of the field. Commonly referenced as the Shattuck Report, it was prepared by Lemuel Shattuck, Nathaniel Banks, and Jehiel Abbott and provided detail about an extensive range of public health problems across the state and provided recommendations for potential solutions. Schools were included among the recommended areas for action to improve the health of the public. Within the report, schools were cited as a responsibility of local health jurisdictions. Among the responsibilities of the local health jurisdiction in schools was monitoring different aspects of the population including the prevalence and treatment of sickness, diseases, and causes of death. The construction of school buildings and inspection for sanitary conditions fell also within the scope of responsibility of local health jurisdictions. These actions were mandated and the results of the activities carried out by the local health jurisdiction were to be written up in a report and provided to the public. Data from previous reports was provided as the basis for a number of recommended actions in schools such as:
the teaching of health and sanitation;

- health and hygiene inspections of youth in schools;
- requiring immunizations and vaccinations for admittance to school;
- education and provision of nurses, including within schools;
- environmental and occupational provisions to ensure sanitation and limiting
  the impact of over-crowding in schools.

Clearly, the basis for much of what occurs in schools today related to health has some
foundational origins in the recommendations contained within the Shattuck Report.

Efforts related to sanitation and hygiene designed to minimize the spread of
infectious and communicable diseases within schools were pervasive in the mid to late
1800’s. This focus was the direct result of increased immigration and urbanization
occurring directly among families and communities, indirectly impacting schools. As
such, school health efforts largely focused on the prevention and control of diseases.
Clinicians were involved often for medical inspection of students. Physicians and dentists
initiated and facilitated the provision of health services in schools. Non-governmental,
philanthropic, women’s organizations, and social workers provided broad social services.
Physicians and nurses conducted screenings and medical inspections in schools and at the
homes of students suspected of carrying potentially infectious diseases. These actions
were especially prominent in areas of high population density and growth, primarily in
urban centers. Combined, these actions were consistent with the recommendation within
the Shattuck Report.
During that time, large urban school districts such as those in Boston, Chicago, Philadelphia, and New York maintained a cadre of medical visitors, who provided their medical services free of charge (Sedlak, M & Schlossman, 1985). Medical visitors included doctors, nurses, social workers and other health professional that provided direct services and support for student and family health needs. Free clinics, affiliated with schools, arose as early as the late 1890’s and primarily provided necessary inspection, immunization, and hygiene services for immigrants. Schools were largely responsible for solving many social ills. As such, they were utilized as full service social centers, providing support for both children and families. To that end, schools had to be: responsive to the needs of both children and families; and a critical resource for communities challenged by rapid urbanization (Dryfoos, 1994).

The impact of lifestyle and behavioral choices on health became an increasing focus during the early 20th century at a time when public health efforts shifted toward the prevention of chronic diseases. To that end, health related strategies in schools continued as a mechanism to restore and control health, but also became essential to efforts related to promoting and maintaining health (Hawkins & Catalano, 1990). In urban schools health inspections continued as a means of identifying and controlling diseases, extracurricular physical activities and health clubs were incorporated afterschool, and out-of-school time activities such as vacation schools (a precursor to summer schools) were established to provide a safe haven during summer months. The initial incorporation of health education was evident within the school setting, with the majority of urban
schools reporting “planned and sequential” health education in schools across all grades with integration among various subjects during the early 1920’s (US DHHS, 1990).

The impact of war and economic challenges, led to several school health reforms including: local and state policies related to school safety and physical activity during World War I (WW1); and, maternal and child health initiatives and national school lunch programs as a result of World War II (WWII). The landscape of physical activity in schools changed drastically post WWII based on an inability of nearly 50% of the first 2 million male draftees to pass mandated military physical exams (Siedentop, 2007).

Finally, during the 1960’s, federal and state mandates such as Head Start, Medicaid, and the Primary and Secondary Education Act expanded services for poor and marginalized populations consistent with a national focus on education as a critical component on the war on poverty. Programs such as Head Start provided a model for comprehensive prevention including a full spectrum of services involving prenatal care, nutritional, mental and social health services, and preschool for youth and families in preparation for entrance into the mainstream educational system (Novello, Degraw & Kleinman, 1992).

Education reforms in the 1970’s and 1980’s focused on establishing educational standards to improve academic outcomes, further limiting the role of non-instructional programs and related staff. Attention to developing collaborative networks of health and social service agencies for the provision of related services was perceived as a burden and an unwelcomed distraction from the primary educational function of schools (Tyack, 1992). Building on the school health and social reforms of the previous decade, the Elementary and Secondary Education Act, Community Health Care Program, Child
Nutrition Act, and School Health Education Study influenced the provision of health and social services within the education setting including a nearly threefold increase in the number of school nurses (Institute of Medicine, 1997).

One of the consistent challenges related to school-based social services has been the perception of health services as peripheral or having a tangential relationship to the primary educational focus of school; and the unequal distribution of services among the population across varying socioeconomic groups (Means, 1975). The perception of schools as solely focused on the provision of direct instruction has historically plagued schools health efforts. This has limited the effectiveness of schools in addressing external factors that contribute to a students ability to be taught. Public schools, in particular, work with the most socioeconomically, racially and ethnically diverse segment of society. The ongoing presence of these challenges has had an adverse effect, further highlighting issues of access, equity of services, and disparity still seen within the school setting. This remains an unfortunate truth within many schools today.

**Health and Learning**

In an effort to better address the complex health needs of youth within the school setting, the CDC has supported research, policies, and programs that provide evidence to support the complex relationship between health and learning. In 1988, the CDC created DASH and began working with partners at the state level and with large urban centers based on four national strategies (Kolbe, et al; 2004):

1. monitoring critical chronic disease risks as well as school policies and programs to reduce those risks;
2. synthesizing and applying research to identify and disseminate effective school policies and programs to prevent chronic disease risks;

3. enabling state, large city, and national education and health agencies to assist local schools implement effective policies and programs to prevent these risks; and,

4. evaluating implemented chronic disease risk reduction policies and programs to assess and consequently improve their effectiveness.

While more expansive and of greater variability in type (public, private, charter), for youth in the United States, schools remain a critical environmental influence, as it is where most youth between the ages of five and eighteen spend the majority of their time. A robust national education infrastructure supports more than 48 million youth, for more than 6 hours a day, over a period of 13 years (Kolbe, Collins & Cortese, 1997). This organization of the educational infrastructure makes schools a unique venue for addressing concerns related to the healthy development of youth. National goals for both education and health incorporate synergistic objectives supporting partnership whereby youth health and educational needs are addressed in concert (Novello, Degraw & Kleinman, 1992). The relationship between health and education is supported by a broad national agenda to support the development of youth.

National goals for both systems incorporate synergistic objectives supporting partnership whereby youth health and educational needs are addressed in concert. Related national leadership by former Surgeon General David Satcher through the publication of the article Healthy and Ready to Learn (2005) in a leading educational journal
documented: changes to the school and community environment that have impacted the health of youth; and, a call to action for the integration of school-based strategies to support the health of young people and their readiness to learn. Further supporting the importance of the relationship between education and health, the national health agenda, *Healthy People 2020* included objectives related to educational achievement including:

- increased proportion of students obtaining proficient achievement of reading and mathematics skills at the fourth, eighth, and twelfth grade;
- increased proportion of students indicating their schoolwork is meaningful and important; and,
- decreased school absenteeism due to illness or injury.

Increasing evidence supporting the identification of factors that contribute both to the educational achievement gap and health disparities has influenced school reform efforts to incorporate the healthy development of youth as part of the mission of schools (Basch, 2011).

The historic relationship between education and health has contributed to the robust body of evidence that supports the relationship between health and learning. This relationship is bidirectional: healthy students are better able to learn; and obtaining an education leads to better health outcomes (Satcher, 2005). In addition to the creation of DASH, several seminal articles and reports in the field of school health have served as a catalyst to the recognition of the “inextricably intertwined” nature of education and health for youth (Novello, 1992).
The Comprehensive School Health Model, described by Allensworth and Kolbe as part of a special edition of the Journal of School Health, has been one of the primary strategies used by the CDC (and formerly DASH) to support school health. The authors cite the evolution in public health and resulting changes within the educational structure as the means for the reorganization of various historic components of school health related education, environment, and social services. While there has been an evolution in the composition of coordinated school health models, they remain the mechanism by which schools work collaboratively to provide health related education and services. The current CDC coordinated school health model includes the following domains:

- health services;
- psychological, counseling, and social services;
- health education;
- nutrition services;
- physical education and other physical activities;
- the psychosocial and biophysical environment;
- health programs for faculty and staff; and,
- integrated efforts for schools, families, and communities to improve the health of students and staff.

Evidence generated and gathered in support of the adoption and implementation of the school health model, was driven by CDC in an effort to build a body of evidence to support its role as an evidence-based practice. As such, data related to the extent to
which health and physical education supported learning, were the initial and remain the most robust areas of research related to the relationship between health and learning.

The “Healthy Children Ready to Learn” Initiative was introduced in 1992, under the direction of Dr. Antonia Novello, Surgeon General of the Public Health Services. This initiative was aligned with the National Education Goals and Health Promotion and Disease Prevention Goals for the year 2000. One of the three National Education Goals related to readiness to learn was described as follows: “by the year 2000, all children in American will start school ready to learn” (DEA, 1990). Identified and included within documents supporting the initiative were the health related factors considered influential to student readiness to learn were:

- prenatal care;
- infant mortality and related risks;
- adequate nutrition and oral health;
- timely and appropriate immunizations;
- injury prevention;
- HIV infection among children;
- drug-exposed infants and children;
- emotional and mental development; and
- Children with disabilities.

The initiative was one of the first national partnerships between the federal departments of Education and Health and Human Services towards independent but mutually beneficial education and public health agendas.
Great Transitions, a report from the Carnegie Council on Adolescent Development (1995) focused on the preparation of adolescents in the 21st century. This report further supported the role of education and health through the promotion of schools as health enhancing environments. Among the recommended contained with the report was the broad integration of health promotion through curricular strategies such as life sciences, social skills training, and social services collaborations. A preventive orientation related to sexual behaviors, violence, and substance use were identified as targeted educational strategies. Finally, advocating for full service schools, the report highlighted the importance of increasing access to health care services through the expansion of school-based health services, increasing health insurance coverage and ensuring the appropriate infrastructure and capacity for related health professionals.

In additional to chronicling the history of health in schools, the 1997 report from the Institute of Medicine titled Schools & Health Our Nation’s Investment identified a path for the future of school health programs and services. As one of the first reports to document the relationship between health and academic achievement, the IOM reported evidence from as far back as the 1970’s related to the role of physical activity and health education on academic achievement. At this time, there was evidence to support poor health outcomes attributed to a lack of education (IOM, 1997). Less robust, however, was data related to poor educational outcomes as a function of poor health. After nearly ten years, data to support components of school health programs and specific health behaviors on educational components was growing, including (Symons, et. al., 1997):
• educational outcomes such as graduation rates, attendance, and standardized test scores;
• educational behaviors such as school attendance, dropout rates, and behavioral problems in schools; and,
• student perceptions such as attitudes towards school and postsecondary aspirations.

In this IOM report no data was provided that directly linked health education efforts to academic achievement. Instead, evidence was provided that demonstrated the benefits of structured, high-quality health education programs within the school setting with outcome measures quite similar to those of traditional academic contents areas. The benefits of physical activity, particularly as a preventive mechanism related to chronic disease such as heart disease and stroke was well documented (CDC, 1999). At that time, however, evidence supporting the relationship between physical activity and academic achievement showed a positive association, including academic benefit from increased time for physical activity instruction (Shepard, et. al, 1984), perceptual motor training programs (Moore, Guy, ad Reeve, 1984; Lipton, 1970) and health related teacher training (McKenze, et.al., 1993). In short, this seminal report laid the foundation for continued research related to the relationship between health and academic achievement and was a call to action for school and community based professionals.

The Adolescent Health and Academic Achievement (AHAA) study was an educational component of the National Longitudinal Study of Adolescent Health (Add Health) combining data related to the behaviors and social context of adolescents with
high school transcripts retrospectively. Researchers at the Population Research Center at the University of Texas Austin led this effort through funding from the National Institute of Child Health and Human Development and the National Science Foundation. The Add Health study explored the health behaviors of a nationally representative sample of US middle and high school students during the 1994-1995 academic year. Participants of this cohort were followed into adulthood, with the last documented contact occurring in 2008. Multiple forms of data were collected as part of an extensive study detailing the manner in which adolescent health behaviors and environmental context influence health, educational, and socioeconomic outcomes (University of North Carolina Population Health Center, 2013). Data from this study have been used to demonstrate the relationship between academic achievement and (Muller, Riegle-Crumb & Frank, 2010; Pearson, Muller, and Wilkinson, 2007; Cavanagh, Schiller & Riegle-Crumb, 2006; Crosnoe et al, 2008)

- Socioeconomic status and health in adulthood;
- Social integration and connectedness;
- Family structure;
- Peer groups and social networks; and
- Health and socioeconomic outcomes of underrepresented ethnic and minority groups.

Most recently, the work of Charles Basch has drawn attention to the relationship between health and learning specific to educationally relevant health disparities, an issue of both equity and social justice as it relates to the achievement gap among urban and
minority youth. During a keynote address with the American School Health Association Conference in 2011, Basch identified the “extent of the health disparity, demonstrated causal impact on educational outcomes, and feasibility of school-based programs and policies” as the criteria utilized to identify seven critical and educationally relevant health factors, including:

- Vision
- Asthma
- Teen pregnancy
- Aggression and violence
- Physical activity
- Breakfast
- Attention deficit and hyperactivity disorder.

A special edition of the *Journal of School Health* further elucidated the link between each of these identified health factors with each being demonstrated as a causal and synergistic impact on a student’s motivation and ability to learn. Summarizing the impact of these findings on and the potential impact on both school health and school reform, Basch wrote: “No matter how well teachers are prepared to teach, no matter what accountability measures are put in place, no matter what governing structures are established for schools, educational progress will be profoundly limited if students are not motivated and able to learn (Basch, 2001, p. 593).

**A Brief History of Alcohol, Tobacco, and Marijuana in the United States**

The complex history of the regulation and legalization of alcohol, tobacco, and
marijuana within the United States has had a direct impact on the health of the population. While these drugs have been present since the beginning of ancient civilizations, their use and environmental access has fluctuated within society. The colonial beginnings of the United States included tobacco as an economic agent, alcohol as a dietary staple, and opiates in ready abundance (Sheldon, 1995). All were considered essential for varying medicinal purposes with little regulation, if any, related to their manufacturing, distribution, and possession. During this time alcohol was considered a form of currency and excessive per capita consumption led to concerns about addiction. By 1830 the average American, 15 years and older drank seven gallons of alcohol a year (PBS, 2013). The economic and social challenges associated with excessive alcohol use were the beginnings of the Temperance Movement.

With social and medicinal histories that exceed the establishment of the United States, the religious freedoms inherent to the development of the nation further confounded issues of substance use. Both secular and non-secular abstinence movements began in the early to mid 1800’s, in addition to the establishment of a number of state and national institutions to treat addiction. The temperance movement, often considered the first war on drugs, urged reductions in the prohibition of alcohol, advanced the first national drug policy as well as the passage of the 18th amendment to the constitution. The 18th amendment took effect in 1920 and prohibited the production, transport, or sale of alcoholic beverages in the US. An unintended consequence of the prohibition of alcohol was an increase in tobacco and marijuana use, as both were legal and cheaper than alcohol (Rublowsky, 1974).
With limited oversight, health professionals often contributed to the addictions of their patients, by “prescribing” drug and alcohol use to cure common ailments and support overall health. Physicians “prescribed” smoking as a means to lose weight and drinking “spirits” was a means of flush out the evils in the body. This was further complicated by the easy availability of drugs and alcohol among the general population. Both the 1911 Hague Opium conference and the 1914 US Harrison Act were the first legislative actions designed to regulate the medicinal use and dispensing of drugs by clinicians. Further, the 1920 Volstead Act prohibited the non-medical use of alcohol and in a landmark 1925 Supreme Court decision drug dependency or addiction was defined as an illness.

Clearly the economic conditions and toll of the Great Depression contributed to the excessive use of alcohol, tobacco, and marijuana during this time and even more so in the 1930’s and 1940’s. The argument against prohibition included the position that the sale of alcohol could become an economic engine driving the country out of the tragically poor conditions of the depression. In 1933 Congress initiated the 21st Amendment, repealing Prohibition, and almost immediately most states followed suit. Further, in 1937 with the passage of the Marijuana Tax Act, the sale and use of marijuana was prohibited. This was the first time marijuana was illegal in the history of the country and initiated what has been commonly referred to as America’s second war on drugs. The basis of this label, the “War of Drugs” was the series of additional legislative action and policies that followed, particularly related to the sale, distribution, and punishment related to narcotics. Both the Boggs Act of 1951 and the 1956 Narcotic Drug Control Act
introduced some of the first mandatory sentences for offenses related to narcotic drugs.

A more tolerant and recreational drug culture emerged in the 1960’s and 1970’s, particularly related to psychedelic drug and opiate use, to some degree in response to anti-war movements related to the US engagement in Vietnam. The use of drugs and portrayal of drug users within the media and popular culture was considered more socially acceptable. Further, social movements related to equality and justice spawned an undercurrent that supported the legalization and decriminalization of marijuana. The 1963 Supreme Court decision of 1963 and the Narcotic Addict Rehabilitation Act of 1966 supported addiction as a disease as well as the role of medical treatment and rehabilitation for substance abusers. Collectively these actions further solidified the relationship between the healthcare and criminal justice systems as both had a responsibility in the prevention, treatment, and rehabilitation of substance abusers and offenders.

To this end, several federal agencies have historically had a mandated responsibility for the management and oversight of research, programs, and policies related to substance use prevention and treatment. These responsibilities were often coupled with the mental health due to increasing evidence about the role of alcoholism and drug abuse with mental illness. In modern history as a part of the post-World War II era, the passage of the National Mental Health Act of 1946 allowed for the establishment of the National Institute of Mental Health (NIMH). The mission of the NIMH was threefold: to support research, to train mental health professionals, and provide funding for states toward the prevention, diagnosis, and treatment of psychiatric disorders.
(National Academies, 1991). The size, scope, and placement within the Public Health Service were consistent concerns about the NIMH, leading to several organizational and legislative mandates in the 1960’s that changed the focus and structure of the agency.

The Great Society programs of the President Lyndon Johnson’s administration were a series of domestic programs and reforms in the 1960’s designed to eliminate poverty and racial injustices. As a part of these reforms there was an increased focus on the provision of direct services, including the expansion of NIMH activities related to drug and alcohol abuse. Specifically, organizational changes moved the NIMH to become a part of the Health Services and Mental Health Administration agency (HSMHA), a newly created agency in 1968. One of the primary responsibilities of HSMHA was to coordinate all direct services components of the PHS. Two other federal institutes resulted from supplemental legislation due in part to increases in alcohol and drug programs: as a result of the 1970 Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment, and Rehabilitation Act, the National Institute on Alcohol Abuse and Alcoholism was established (NIAAA) and the passage of the 1972 Drug Abuse and Treatment Act of 1972 led to the establishment of the National Institute on Drug Abuse (NIDA).

Concerns about limited research, professional concerns within the field, and the governmental provision of direct services, led the Nixon administration to commission the Gardner Report in 1973. The Gardner Report was a result of a taskforce charged with determining how to structure the research, service, and training responsibilities of alcohol, drug, and mental health at the federal level. In order to provide leadership and
visibility and address the stigma associated with substance use and mental health, the Alcohol, Drug, and Mental Health Administration (ADAMHA) was created. ADAMHA consisted of the National Institute of Mental Health (NIMH), the National Institute on Alcohol Abuse and Alcoholism (NIAAA), and the National Institute on Drug Abuse (NIDA). Among the primary strategies of ADAMHA was a focus on prevention: as a means of improving the health of Americans. Both the timing and focus of these strategies were consistent with the release of the first Surgeon General’s Report in 1979. Further, in an effort to develop an agency framework for prevention policies and programs, former ADAMHA Administrator Gerald Klerman convened a national conference to explore (Klerman, 1981):

1. relevant opportunities and challenges in health promotion and disease prevention;
2. similarities in alcohol, drug, and mental illness prevention programs for youth; and
3. culturally competent approaches in alcohol, drug, and mental illness prevention programs.

The organization and function of ADAMHA towards that provision of direct service remained despite concerns about limitations in research, particularly among mental health advocates. In 1987, however, in a report requested by the US Senate, the “Lewin Report”, extensive interviews and feedback from public and private sector representatives were conducted to assess the current state of the agency. Several reorganizational strategies were provided and in 1992 the Substance Abuse and Mental
Health Services Administration (SAMHSA) was created. SAMHSA is now an “agency within the U.S. Department of Health and Human Services that leads public health efforts to advance the behavioral health of the nation. SAMHSA's mission is to reduce the impact of substance abuse and mental illness on America's communities (DHHS 2013).

As a part of SAMHSA, the Center for Substance Abuse Prevention (CSAP), the Center for Substance Abuse Treatment (CSAT), and the Center for Mental Health Services (CMHS) make funding available through grants designed to support SAMHSA’s mission. In collaboration with the Office of National Drug Control Policy (ONDCP), SAMHSA and CSAP oversee the Drug-Free Community Support Program. Since 1998, approximately 130 million dollars has been appropriated to support more than 1600 community coalitions funded by the Drug-Free Community Support Program. These funded coalitions develop and implement community-based strategies to support alcohol and drug prevention. As part of the evidence supporting this funding, The Drug-Free Communities Act of 1997 cited adolescent substance use as being at the core of a number of public health problems plaguing or communities, including academic achievement and economic stability (USC, 1997).

**Adolescents and Substance Use**

Historically, the leading causes of death among adolescents have occurred primarily from preventable causes, mainly intentional and unintentional injuries (CDC, 2013). In order to make improvements in the health of adolescents it has been important to understand and explore the underlying factors that contribute to these causes. There is a direct and well-documented relationship between unintentional and intentional injuries
and the use of both legal and illicit substances among adolescents (CDC, 1999).
Substance use, impairment, and addiction have been identified as contributing factors to
these causes of death among adolescents (CDC, 1999). Further, the reported rates of
substance use among American youth are higher than any other developed country
(Diclemente, Santelli & Crosby, 2009). For these reasons, a focus on the prevention and
reduction of adolescent substance use has had a consistent presence as a part of the
national public health agenda (DHHS, 2010).

Adolescent substance use has been characterized in different ways. Substance use
among adolescents is considered as the use of legal substances such as tobacco and
alcohol as well as illicit substances such as marijuana, cocaine or opiates. Beyond
prevalence estimates, the type of substance, pattern of use, and age of onset are
commonly cited among related research. Historically, alcohol, tobacco, and marijuana
have been the most common drugs used by adolescents (CDC, 2010). The patterns of use
among adolescents typically fall within the spectrum of never use or abstainers to heavy
or chronic users. The frequency of use along this spectrum varies from ever use, to use
within the last year, month, week, or day. There is also variation in the literature about
the amount or consumption of substances within these time frames. Finally, the
cognitive, behavioral, and educational consequences for engagement in substance use
among adolescents have been another way in which adolescent substance use is
commonly described.

One of the most prominent characterizations of youth substance use has been
based on the seminal work of Jenner (1975) and been commonly referenced as the
Gateway Hypothesis. This original research explored the sequence of drug use as part of a longitudinal study of high schools students in New York City. The results indicated that within the 6-month follow-up, nearly 27% of students who had previously reported using alcohol or tobacco progressed to marijuana use, compared to only 2% progressing to marijuana use among those who had previously reported no alcohol or tobacco use. Further, progression from marijuana to illicit drugs occurred among 26% of those students who had previously reported marijuana use, but was significantly less among nondrug marijuana users (1%) and legal drug users (4%) (Jenner, 1975). Accordingly, the Gateway Hypothesis suggests that the use of legal drugs such as alcohol and tobacco are a necessary condition for the progression to illicit drugs such as marijuana and other hard drugs.

While the work of Jenner represents an important contribution to the field of substance use prevention, the Gateway Hypothesis is not without controversy. Among the primary criticisms is the lack of a causal pathway for substance use and addiction. As previously indicated, there are a complex set of individual, interpersonal, and environmental factors that contribute to health, including those that impact issues of substance use. Another criticism is the bidirectional and often co-morbid nature of the relationship between substance use and other health behaviors and conditions (NIDA, 2005). Consider, for example this historic pairing of mental health and substance use services. It can be reasonably argued that mental health challenges can both result from and occur with substance use. Finally, changes in drug use patterns over time including the rates of marijuana use and prescription drug use have highlighted the need to consider
additional drugs that may influence the sequence and patterns of substance use (CADCA, 2010).

It is accurate that the prevalence of alcohol, tobacco, and marijuana use indicates that they are the drugs most commonly used by adolescents (CDC, 2010). These findings, however, do not necessarily support the causal pathway and patterns of use suggested by the Gateway Hypothesis. There is consensus, however, that there is variability in the type, use pattern, and age of initiation among adolescent substance users that may lead to chronic use or addiction (Diclemente, Santelli & Crosby, 2009). What is now known about the epidemiology of substance use among adolescents stems in large part from research studies and national surveys of youth. One of the most widely recognized instruments related to substance use among youth is from the Monitoring the Future (MTF) study. The MTF study is an annual survey assessing the drug and alcohol behaviors and perceptions of 8th, 10th, and 12th grade students. The MTF study has occurred annually since 1975 and is conducted by researchers at the Survey Research Center at the Institute for Social Research at the University of Michigan. This research study has been funded by NIDA and NIH and results of each survey administration are released annually each fall. The most recent MTF results were published in December 2013 and included information about trends in substance use from 2010 through 2013.

Table 1 summarizes the alcohol, cigarette, and marijuana behaviors of 8th grade students reported as a part of the 2013 MTF Study. There is a trend towards decreasing use among all drug use categories and patterns of use. These decreases in use, however, are only statistically significant for lifetime and past year use of alcohol for 2011 and
2012. Past month use of alcohol was significant at 11.0% for 2012. For cigarette use there was a statistically significant decrease in both lifetime use (15.5%) in 2012 and past month use (11.0%) in 2012. In 2010 there were statistically significant decreases in past year (13.7%), past month (8.0%) and daily (1.2%) of marijuana use.

Table 1. 2010-2013 MTF – Trends in Alcohol, Tobacco, and Marijuana Use Among 8th Grade Students

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Lifetime</td>
<td>35.80</td>
<td>(33.10)</td>
<td>(29.50)</td>
<td>27.8</td>
</tr>
<tr>
<td>Past Year</td>
<td>29.30</td>
<td>(26.90)</td>
<td>(23.60)</td>
<td>22.10</td>
</tr>
<tr>
<td>Past Month</td>
<td>13.80</td>
<td>12.70</td>
<td>(11.00)</td>
<td>10.20</td>
</tr>
<tr>
<td>Daily</td>
<td>0.50</td>
<td>0.40</td>
<td>0.30</td>
<td>0.30</td>
</tr>
<tr>
<td>Cigarettes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifetime</td>
<td>20.00</td>
<td>18.40</td>
<td>(15.50)</td>
<td>14.80</td>
</tr>
<tr>
<td>Past Month</td>
<td>7.10</td>
<td>6.10</td>
<td>(4.90)</td>
<td>4.5</td>
</tr>
<tr>
<td>Daily</td>
<td>2.90</td>
<td>2.40</td>
<td>1.90</td>
<td>1.80</td>
</tr>
<tr>
<td>½ pack/day</td>
<td>0.90</td>
<td>0.70</td>
<td>0.70</td>
<td>0.70</td>
</tr>
<tr>
<td>Marijuana</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifetime</td>
<td>17.30</td>
<td>16.40</td>
<td>15.20</td>
<td>16.50</td>
</tr>
<tr>
<td>Past Year</td>
<td>(13.70)</td>
<td>12.50</td>
<td>11.40</td>
<td>12.70</td>
</tr>
<tr>
<td>Past Month</td>
<td>(8.00)</td>
<td>7.20</td>
<td>6.50</td>
<td>7.00</td>
</tr>
<tr>
<td>Daily</td>
<td>(1.2)</td>
<td>13.00</td>
<td>1.10</td>
<td>1.10</td>
</tr>
</tbody>
</table>

Note. The prevalence of substance use is reported in percentages. The percentages in parentheses () indicate a statistically significant change from the year before. For example, the 2011 lifetime prevalence for alcohol use was reported as 33.10%. This is significantly lower than the reported rate of lifetime alcohol use in 2010.

**YRBS Data of Substance Use Behaviors Among Middle School Students**

Two national YRBS reports have been published about the health risk behaviors of middle school students. The first in 2005 based on the 2003 national middle school YRBS and the second in 2007 based on the 2005 national middle school YRBS. In both reports, a national profile of middle school students was developed based on the participation of selected states and local or city specific survey administrations from
across the United States. The 2003 report is based on the participation of seven state and six local YRBS administrations. Similarly, the 2005 report is based on the participation of five state and 8 local YRBS administrations. Both reports are based on sample sizes, school response rates and students response rates that all for the data to be considered representative of the population in which the survey was administered.

Both the 2003 and 2005 versions of the YRBS, items were included specific to the CDC identified risk behavior categories of tobacco use and alcohol and other drug use. Table 2 includes prevalence estimates of lifetime cigarette, alcohol, and marijuana use among middle school aged students from both the 2005 and 2009 national Middle School Youth Risk Behavior Survey reports. Self-reported rates of ever drinking alcohol were the highest when compared to either cigarette or marijuana use. Lifetime use of cigarettes, alcohol, and marijuana were higher among 8th grade students in both 2003 and 2005. Interestingly, while there are a number of different items on the instrument that

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<th>7th</th>
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</thead>
<tbody>
<tr>
<td>Cigarette</td>
<td>30.0 (19.1-45.8)</td>
<td>49.0 (28.6-58.0)</td>
<td>33.3 (21.2-38.9)</td>
<td>37.7 (24.8-54.6)</td>
</tr>
<tr>
<td>Alcohol</td>
<td>43.8 (29.8-48.4)</td>
<td>53.8 (45.7-65.5)</td>
<td>42.3 (26.3-49.8)</td>
<td>51.1 (35.2-66.1)</td>
</tr>
<tr>
<td>Marijuana</td>
<td>13.9 (8.4-18.2)</td>
<td>24.3 (12.1-33.0)</td>
<td>14.9 (8.0-18.0)</td>
<td>21.2 (12.9-38.2)</td>
</tr>
</tbody>
</table>

Note. The median and range for reported rates is provided based on the national YRBS results published in 2005 and 2007. For example, in 2003 among 7th grade respondents 30.0% reported ever using a cigarette. The prevalence range for lifetime use among participating cities is between 19.1% and 45.8%.
assess the use of different types of tobacco products, only information related to the lifetime use of cigarettes was provided in the report.

Table 3 includes prevalence estimates of current tobacco use among middle school aged students from both the 2005 and 2007 national Middle School Youth Risk Behavior Survey reports. Data for the variable identified as all tobacco is based on the combined self-reported rates of cigarettes, cigars, and snuff. Accordingly, in both years the self-reported rate of cigarette use was lower than that which was reported for all tobacco use. This is an indication that middle school students are current users of cigarettes in addition to other tobacco products. Consistent with the previously identified pattern of increased use by grade level, the reported rates of both cigarette and all tobacco products was high in the 8th grade versus 7th grade in both 2003 and 2005.

Table 3. National YRBS - Current Tobacco Use Among Middle School Students

<table>
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</thead>
<tbody>
<tr>
<td>Cigarette</td>
<td>7.0 (5.0-8.6)</td>
<td>10.3 (6.3-16.5)</td>
<td>6.8 (5.8-8.2)</td>
<td>10.7 (8.8-12.7)</td>
</tr>
<tr>
<td>All Tobacco</td>
<td>11.5 (9.4-12.4)</td>
<td>15.2 (10.0-20.6)</td>
<td>8.0 (7.4-10.1)</td>
<td>14.8 (9.1-22.6)</td>
</tr>
</tbody>
</table>

Note. The median and range for reported rates is provided based on the national YRBS results published in 2005 and 2007. For example, in 2003 among 7th grade respondents 7.0% reported current cigarette use. The prevalence range for current cigarette use among participating cities is between 5.0% and 8.6%.

Consistent with the focus on delaying engagement in risk behaviors, the middle school YRBS contains items across risk behavior categories that focus on engagement in risk behaviors prior to age 11. Table 4 describes the use of alcohol, cigarettes, and
marijuana among middle school student prior to the age of 11. Use of Alcohol is again higher that cigarettes or marijuana prior to the age of 11. While use of cigarettes prior to age 11 is reported at the second highest rates, it does not reflect the use of all types of tobacco products. It is reasonable to assume that the combined rate for all tobacco use among this population would be higher. Grade level trends for use of drugs prior to age 11 continue with higher self-reported use in the 8th grade versus 7th grade. Based on all of the data provided, regardless of the pattern of substance use, data related to alcohol, tobacco, and marijuana use was consistently higher as grade level increased.

Table 4. National YRBS – Use of Drugs Before Age 11 Among Middle School Students

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
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<th>2005</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>7th</td>
<td>8th</td>
<td>7th</td>
<td>8th</td>
</tr>
<tr>
<td>Cigarette</td>
<td>7.0 (6.1-9.4)</td>
<td>7.7 (5.5-11.0)</td>
<td>6.4 (4.6-8.9)</td>
<td>6.6 (4.9-12.3)</td>
</tr>
<tr>
<td>Alcohol</td>
<td>20.4 (16.7-23.0)</td>
<td>20.7 (16.8-25.2)</td>
<td>18.5 (15.5-20.0)</td>
<td>17.2 (14.8-26.3)</td>
</tr>
<tr>
<td>Marijuana</td>
<td>3.0 (1.3-3.8)</td>
<td>2.4 (1.3-4.2)</td>
<td>5.7 (3.5-6.4)</td>
<td>6.3 (4.2-8.6)</td>
</tr>
</tbody>
</table>

Note. The median and range for reported rates is provided based on the national YRBS results published in 2005 and 2007. For example, in 2003 among 7th grade respondents 7.0% reported ever use of a cigarette before age 11. The prevalence range for use of cigarettes before age 11 among participating cities is between 6.1% and 9.4%.

Local YRBS Data About Adolescent Substance Use

In December 2012 the PRCHN released the 2012 Cuyahoga County Middle School Youth Risk Behavior Survey Report. This report was prepared by researchers at CWRU and provided a detailed overview of the methods and results associated with the administration of the CCMSYRBS in the spring of 2012. The demographic profile in the
report, indicated that of the more than 12,000 subjects there were included in the study, there were equal numbers of both and male and female (49.7% and 50.3% respectively) and 7th and 8th grade (47.0% and 53.0% respectively) students. The racial and ethnic profile of the sample was nearly 40% white, 34% Black, 13% Hispanic, and 13% identified as other racial and ethnic groups. The socioeconomic status of the samples was reported as 44% high, 31.4% low, and 24.4% based on use of the FAS II.

Prevalence estimates for the types and patterns of alcohol, tobacco, and marijuana use were included within the report. Lifetime use of cigarette and alcohol use was reported at 8.8% and 27.7% respectively. Lifetime use of cigarettes does not account for other tobacco products used by adolescents such as cigars, cigarillos, or snuff. The 2012 CCMSYRBS did include an items related to the current (past 30 day use) of little cigars. Current little cigar use was reported at 3.7%. It is reasonable to assume, however, that lifetime use of little cigars would be higher than the reported current rate. Current use, or use within the past 30 days, was reported at 6.7% for tobacco, 9.5% for alcohol, and 6.5% for marijuana.

Trend data, from 2008, 2010, and 2012 related to the types and patterns of substance use, specifically tobacco and alcohol, were also included in the 2012 Cuyahoga County Middle School Youth Risk Behavior Survey Report. In this instance, trend data allowed for the comparison of prevalence estimates overtime in order to examine changes in the reported rates of risk behaviors among middle school aged adolescents within the county. There were significant decreases in lifetime cigarette use (21.2% in 2008, 11.9% in 2010, and 8.8% in 2012). There was also a significant decrease in current cigarette
use, but only when comparing 2008 (5.4%) and 2012 (3.7%). There were no significant changes in the reported rates of current cigarette use from 2008, 2010, or 2012. With one exception, all of the reported rates for lifetime alcohol use (38.3%, 33.8%, and 27.7% respectively), current alcohol use (14.4%, 12.3%, and 9.5% respectively) and alcohol use (14.3%, 10.5% and 8.4% respectively) before the age of 11 significantly decreased based on data from 2008, 2010, and 2012. The exception applies only to the decreased rates of alcohol use before age 11. While there were decreases in the reported rates between all years, the only years among which that decrease was statistically significant was 2010 (10.5%) and 2012 (8.4%).

**Adolescent Substance Use and Academic Achievement**

Substance use prevention programming in schools during the 1980’s and 1990’s, stemmed in part from the national “War on Drugs” and the detrimental consequences of drug use among youth (Dupont, 2009). These prevention programs were some of the first to be implemented, largely based on the perception of the relationship between substance use and academic achievement. The underlying premise behind such programs, was that the prevention of substance use would improve academic achievement. The relationship between academic achievement and substance use is, however, far more complex. Since this time, evidence supporting the bidirectional nature of substance use has been mounting. That is, among adolescents and young adults, poor academic achievement has been demonstrated to predict substance use and substance use has been shown to predict academic performance (Schulenberg, O’Mally, Bachman & Johnson, 2003; King, Meechan, Trim & Chassin, 2006).
In a study exploring evidence of the relationship between health risk behaviors and academic achievement, Bradley and Greene (2013) conducted a 25-year review of peer-reviewed journals between the years of 1985 through 2010. The health risk behaviors included in this study were consistent with those previously identified by the CDC. Approximately 122 articles were included that consisted of research on at least one health risk behavior and academic achievement as variables of interest. More than 96% of the articles provided evidence to support a statistically significant inverse relationship between health risk behaviors and academic achievement. Importantly, among the categories of tobacco use and alcohol and other drug use, approximately 28 and 44 published studies were included in the study respectively. In total, the articles reflected research that was both cross sectional or longitudinal, spanning a range of 10 months to 23 years. Among the research cited as a part of this study, academic achievement was measured mainly by grades and performance on standardized tests.

Bradley and Greene (2013) cited a relationship between tobacco use and academic achievement, such that students with higher academic achievement were significantly less likely to use tobacco products when compared to their peers. The majority of the studies cited as the basis for this claim were conducted among high school and college-aged adolescents. There were however, a few studies conducted among middle school students that further supported the author’s stance.

In a 4 year longitudinal study using data from the Monitoring the Future study (MTF), Bryant et. al. (2000), examined current cigarette use (use within the past 30 days) and academic achievement (measured by self-reported grades). A significantly increased
likelihood of cigarette use between 8th and 10th grade was found among students who self-reported lower grades in the 8th grade. Similar findings based on the MTF study have found current use of cigarettes among 8th grade students being associated with lower academic achievement (Bryant et. al., 2003; Bryant et. al., 2006). In another study exploring current smoking, Berg et. al. (2009) reported that adolescents who identified as current smokers self-reported lower levels of academic achievement when compared to their non-smoking peers.

While evidence supporting the relationship between current cigarette use appears more robust, there are other patterns of cigarette use that have evidence to support the relationship to academic achievement in youth. Brayant et. al (2002) reported that students who reported high levels of academic achievement self-reported smoking fewer cigarettes when compared to their peers. In a study among 7th grade students from the RAND Adolescent Panel Study, Ellickson, Tucker and Klein (2001) reported that experimenters (students who tried cigarettes in their lifetime) were up to 2 times more likely to have low grades and already repeated a grade when compared to their non-smoking peers. Further, heavy cigarette use (1 pack per day or more) was more likely to be reported among students with lower grades and male students who reported lower grades were more than 3 times more likely to become heavy smokers when compared to their higher performing and non-smoking peers (Griffin et. al, 1999)

Bradley and Greene (2013) cited a relationship between alcohol and other drug use and academic achievement, such that students with higher academic achievement were significantly less likely to use alcohol or other drugs when compared to their peers.
Among those studies cited in support of this relationship, very few were specific to the use of alcohol or marijuana among middle school students. Ellickson, Tucker and Klein (2003) explored different patterns of alcohol use among students including: experimenters (drank less than 3 times in the past year and not in the past month); and drinkers (drank more than 3 or more times in the past year or drank in the past month). Researchers reported that both drinkers and experimenters were more likely to have lower grades when compared to non-drinking peers. Interestingly, in a cross-sectional study among 4th and 6th grade students Jackson (1997) reported that initiation and experimentation with alcohol were associated with lower academic grades. This study is one the few to explore issues of substance use, particularly alcohol use among early adolescents.

Both the sensitive nature of the topic and the age of the students are among the challenges associated with conducting research related to substance use among youth. Further, research among middle school students related to illicit drug use, including marijuana is likely limited due to lower prevalence rates of illicit drug use among early adolescents. There have been, however, a few studies that explored the use of marijuana or both alcohol and marijuana among middle school aged youth. Ansary and Luthar (2009) conducted a longitudinal study of youth aged 13-19 and reported that students who used marijuana had poorer academic achievement of at least a full letter grade. Clark, Belgrave, and Nasim (2008) as part of a cross-sectional study among minority youth found the current (past 30 day) use of both alcohol and marijuana were significantly associated with lower self-reported grades. Similarly, Feinberg, Ridenour,
and Greenberg (2007) reported a negative correlation between alcohol and marijuana use and academic performance.
CHAPTER III

RESEARCH METHODS AND PROCEDURES

The purpose of this study was to examine the relationship between substance use and academic achievement among middle school aged youth in an urban Midwestern county. Use of alcohol, tobacco, and marijuana will be explored based on data from the Cuyahoga County Middle School Youth Risk Behavior Survey (CCMSYRBS) administered in the spring of 2012.

Cuyahoga County Middle School Youth Risk Behavior Survey

Since 2001, the Youth Risk Behavior Survey (YRBS) has been administered annually among middle and high school students in Cuyahoga County, Ohio. The most recent YRBS administration among early adolescents, middle school youth ages 10 to 14, occurred during the 2011-2012 academic year. During the spring of 2012, the CCMSYRBS was administered among middle school students within the county. For this research, data from this original study will be used for secondary analysis.

Study Population and Samples

Cuyahoga County is located in northeastern Ohio and has been designated by the National Center for Health Statistics (NCHS) as a large central metropolitan area. By definition, counties with this designation have a population of more than 1 million and meet one or more of the following criterion (CDC, 2012, pg. 10):

1. contain the entire population of the largest principal city of the metropolitan service area
2. are completely contained within the largest principal city of the metropolitan service area

3. contain at least 250,000 residents of any principal city in the metropolitan service area.

This categorization represents the highest level of urbanization possible at the county level and is consistent with local, state, and national guidelines for designation as an urban county (USHUD, 2009).

Within Cuyahoga County there are approximately 31 school districts. All public schools within the county having students in grades 7 or 8 were eligible for participation in the original 2012 CCMSYRBS study. Approximately 102 middle schools were identified for participation based on a two-stage sampling framework recommended by the CDC (PRCHN, 2012). In 2012, the CDC published *A Guide to Conducting Your Own Youth Risk Behavior Survey* in an effort to assist state and local agencies interested in administering the YRBS. One of the underlying tenants of this document is that effective and efficient survey administration procedures minimize disruption to the traditional school process. To that end, the proposed sampling design recognizes that it is unlikely that either all school or all students within a given area will participate in the survey process. The process for making decisions about YRBS sampling within a specific region is based on the following (CDC, 2012):

1. Deciding what grades to include.

2. Deciding how schools and students will be selected to participate.

3. Use scientific sampling procedures.
The scientific sampling procedures are designed to elicit a representative sample and occur in two stages including (CDC, 2013):

1. probability sampling of schools based on enrollment, followed by
2. sampling of students by school at the classroom level either by required subject or period of the day.

In the original 2012 CCMSYRBS study, all of the 102 middle schools within the county were eligible for participation based on the identified probability sampling strategy. Use of this strategy implied that schools with greater enrollment had a greater probability of being selected for participation in the study. Schools could decline participation even if selected as eligible for the study. As a modification to the CDC protocol, participating schools were provided with the option of administering the survey to all students within the school or those only within randomly selected classrooms (PRCHN, 2012). For those schools that agreed to participate using a sample of their students, a list of required courses at each grade level was obtained. Alternatively, in lieu of a required course, schools could also choose survey administration among a sample of their students for a required period of the day during which all students had class. Similarly, among schools selecting a whole school administration, either a period of the day or required course were identified during which survey administration would occur.

Per CDC recommendations (2012) for the administration of the YRBS, an overall response rate of 60% is recommended in order to obtain a representative sample of the population. The calculation of the overall response rate is based on the multiplication of both the school and student response rates. The calculation of the school response rate is
based on a proportion resulting from the division of all participating schools by those schools that were identified as eligible. The corresponding student response rate is calculated in a similar manner based on the proportion of participating and eligible students.

In the 2012 Cuyahoga County Middle School YRBS Report researchers cited an overall response rate of 72.0%. This rate was based on the participation of 89 out of 102 eligible schools (87.2% school response rate) and 12,341 usable surveys completed among the 14,953 students (82.5%) eligible to complete the survey (PRCHN, 2012). All cases contained within the dataset will be included in the secondary analysis. Based upon the overall response rate and use of the CDC’s YRBS sampling procedures it reasonable to presume that the data is generalizable, or representative of all 7th and 8th grade students in Cuyahoga County.

**Instrumentation: YRBS and CCMSYRBS**

As a part of research studies, data is used to assist in answering specific research questions. The research questions are based on variables that are unique to the specific study. Variables represent “specific characteristics of the population (Rea & Parker, 2005, p.60).” While the items on the YRBS are designed to measure risk behaviors, there is variation in the level or scale of measurement for individual variables. Sanocki (2001, pg. 6) defined the four scales of measurement as:

1. **nominal**, a level of measurement where each value is a name, category or label of no particular order or ranking.
2. ordinal, a level of measurement where each value is in order from high to low without equal intervals;

3. interval, a level of measurement where each value each value is in order from high to low, with equal intervals; and

4. ratio, a level of measurement where each value is in order from high to low, with equal intervals and an absolute zero point;

Nominal measures allow for naming, categorization, or classification. Demographic characteristics such as race and gender are examples of nominal measures found on the YRBS. Ordinal measures have an order or direction such as rankings or levels of agreement. There is not, however, any way to quantify the difference in levels. Items that assess perceptions such riskiness or likelihood are examples of ordinal measures included as a part of the YRBS. Interval scales, often referred to as continuous variables, provide information about order and have equal intervals. Age in years is an example of a continuous variable found on the YRBS. The YRBS includes physical measurements such as height and weight, which are considered ratio data. These scales of measurement are important in determining the type of analysis that can be conducted.

Sources of Scales

The 2012 CCMSYRBS is largely based on the YRBS instruments developed by the CDC. At the time of the original study, the most recent version of the instrument available for use was created in 2011. For this year, the CDC created three unique versions of the survey (CDC, 2011):
1. Standard High School
2. National High School
3. Middle School

The 2011 Standard High School YRBS was used as the basis for the development of the 2012 CCMSYRBS. The 2011 Standard High School YRBS was an 86-item instrument comprised of the following (CDC, 2011):

- 7 items related to demographic characteristics
- 4 items about safety
- 10 items about violence-related behaviors
- 2 items about bullying
- 5 items about sad feeling and suicide
- 11 items about tobacco use
- 6 items about alcohol
- 4 items about marijuana use
- 10 items about other drugs
- 7 items about sexual behaviors
- 5 items about body weight
- 7 items about food consumption
- 5 items about physical activity
- 3 items about other health-related topics.

The orientation of the 2011 Standard High School YRBS reflects the cumulative evolution of the YRBS since the 1990’s. Many of the items that remain on the instrument
have been in existence, in some form, since the initial administration of the survey. The items within the 2011 instrument are largely grouped into categories consistent with risk behaviors that contribute to the leading categories of morbidity and mortality in adulthood. This approach has been utilized consistently since the first national survey administration in the early 1990’s.

Of the 86 items that were a part of the 2011 Standard High School YRBS approximately 28 items were included on the 2012 CCMSYRBS with the exact wording of both the stem and response set for the item. Another 9 items were included from: the 2011 National High School YRBS or 2011 Middle School YRBS; or some modification to the wording of either the item stem or response from one of the 2011 CDC YRBS surveys. The remaining 67 items were included from:

- a combination of sources including optional scales or individual items created by the CDC;
- specific measures required as a part of local, state, and federal funding; and,
- items created and incorporated based on local interests of CWRU researchers or agencies providing funding to support local surveillance efforts.

The resulting CCMSYRBS is a 104-item instrument comprised of the following:

- 14 items related to demographic characteristics
- 4 items about heights and weight
- 2 items about safety
- 6 items about diet
- 3 items about physical activity
5 items about tobacco use
4 items about alcohol
4 items about marijuana use
4 items about other drugs
7 items about violence-related behaviors
3 items about sadness and suicide
2 items about sexual behaviors
3 items about other health-related topics
6 items about activities and experiences at home and school
3 items about family interaction and social support
2 items about social networking
10 items about parental monitoring
6 items about parental permissiveness
4 items about perception of risk or harm
12 items about food availability and snacking habits.

For the purpose of this study, a unique subset of the 2012 CCMSYRBS instrument, focusing specifically on substance use will be used for analysis. While all of the previously identified 12,341 cases will be included, only data related to the following items will be used for analysis:

9 items related to demographic characteristics
3 items related to tobacco use
2 items related to alcohol use
- 2 items related to marijuana use

For the current study, of the 16 items included for secondary analysis, all but 4 items come from core or optional modules provided by the CDC for inclusion on the YRBS. These core or optional items are specific to demographic characteristics, tobacco use, alcohol use, marijuana use, other drug use and other health-related items.

There are, however, 4 demographic items included in the study that are not from the core or optional YRBS items provided by the CDC. These 4 demographic items comprise the Family Affluence Scale (FAS) II and were included to assess socioeconomic status. The following items are included as a part of FAS II:

1. Does your family own a car, van, or truck?
2. Do you have your own bedroom for yourself?
3. During the past 12 months, how many times did you travel away on vacation with your family?
4. How many computers does your family own?

The FAS was developed and utilized by the World Health Organization (WHO) as a part of the Health Behavior in School-Aged Children Study and has been used as a proxy measure for socioeconomic status (Boyce, Torsheim, Curric, & Zambon, 2006).

**Psychometric Properties**

A number of methodological studies have been designed and conducted to support the ongoing development and implementation of the YRBS. Brenner et. al. (1995) conducted one of the first studies designed to assess the test-retest reliability of the YRBS instrument. A convenience sample of more than 1600 students, grades 7-12, from
5 schools districts in states across the US was used for analysis. Students completed the survey on two predetermined occasions over an approximately two-week period of time. Kappa statistics and prevalence estimates were calculated for the 53 items included in the analysis.

The Kappa statistic is commonly used to measure agreement between two observations (Dawson & Trapp, 2001). Landis and Koh (1977) recommended the following categorization of Kappa values:

- Less than 20% as slight agreement
- 21-40% as fair agreement
- 41-60% as moderate agreement
- 61-80% as substantial agreement
- 81-100 almost perfect agreement.

In this study, more than 90% of the items reported moderate or high levels of agreement and mean kappas for alcohol, tobacco, and marijuana use ranged from 68-88% (Brener et. al, 1995). Further, when analyzed by grade level, there were higher levels of inconsistency among 7th grade students, than any other grade level. The results of this study implied that some revisions were needed for items on the YRBS instrument with lower levels of agreement. Additionally, there was evidence to suggest the presence of issues of cognition and readability for younger students completing the survey. The purpose of this type of statistical analysis, reliability testing, is to assess the consistency of results each time a scale or instrument is administered.
Brener et. al (2002) repeated the study related to the reliability of the YRBS based on the 1999 instrument. For this study, a sample of more than 4500 students completed the survey on two predetermined occasions over an approximately two-week period of time. Among the 72 items included for study, Kappa statistics and prevalence estimates revealed that: nearly 4 out of 5 items had consistent prevalence estimates; and more than 85% of the items had both Kappas above 61% and consistent prevalence estimates (Brener et.al, 2002). Importantly, the mean Kappa values for items within the categories of tobacco use and alcohol and other drug use were the highest (68.8 and 63.4 respectively) when compared to other risk behavior categories (range 49.7 to 68.8). A consistently high and repeated level of agreement for items related to substance use, further demonstrated the reliability of the instrument, particularly among items within these specific categories of risk behavior.

Establishing reliability is a necessary condition for validity. Creswell (2009) described validity as the ability of a scale to measure, with accuracy, that which it was intended to measure. Cumulatively, these methodological studies have led to improvements in both the wording of items and interpretation of data over time. Ongoing efforts to improve the reliability of the YRBS have focused on the refinement of specific items for which levels of agreement have been low, such as self-reported height and weight, race and ethnicity, diet and physical activity (Brener, Kann & McManus, 2003; Eaton et. al, 2013). Other methodological studies have explored external factors such as the setting or method of survey administration (Kann et. al, 2002; Brener et al., 2006; Denniston et. al, 2007).
Based on some initial concerns about readability, the YRBS is now written at a 7th grade reading level (Kann, 2001). In addition to the elimination or modification of items with lower levels of agreement in previous studies, there are now specific versions of the instrument for different age ranges. Both instruments, the high school YRBS and middle school YRBS, include items designed to assess behaviors across the six broad categories of risk behaviors. In general, the high school level YRBS has more items that assess unique patterns of behavior within each category. The middle school level YRBS, however, more specifically focuses on the age of onset for specific behaviors, particularly behaviors occurring on school property.

In a 2004 study, Brener et. al., assessed the wording of items and language related to truthfulness in survey completion. Researchers identified, the wording of items as a more significant contributor to differences in prevalence estimates across multiple surveys than differences in the strength of language requesting honesty in survey completion. While the CDC provides recommended language and wording for survey administration, some variation in language had been explored as part of the consent process and survey instructions. These variations were designed to evoke more truthfulness among the survey respondent. One of the criticisms of self-reported data, particularly among youth is their ability to both recall and accurately report on engagement in behaviors that are perceived as “bad” or against societal norms. Over time, as issues related to the wording of items on the YRBS have been addressed in an age and developmentally appropriate matter, researchers have started to explore other factors or components of the instrument that contribute to its validity.
A number of cognitive and situational factors, issues internal and external to the individual, affect the validity of self-reported behaviors among adolescents. There is variation, however, in the extent to which these factors threaten the validity of self-reported data across behavioral categories. In order to minimize threats to validity, particularly with the use of instruments among the adolescent population, the following strategies should be employed (Brener, Billy, & Grady, 2003):

- use relatively short reference periods to avoid challenges associated with the need to recall information;
- use simple language to avoid confusion in the comprehension of unfamiliar words; and
- utilize administration methods that promote actual and perceived privacy.

Overtime, these strategies have been broadly incorporated as a part of YRBS administration at the federal level and have been included in the guidelines for the administration of the survey at both the state and local level.

The CCMSYRBS incorporates reference periods for substance use based on both lifetime and current use. This can be further characterized as ever use and use within the past 30 days respectively. Further, in the stem of items related to various legal and illegal substances, examples of products, acronyms, or commonly used names are provided for clarification. For example, items that ask students to report information about snuff, a particular type of tobacco use, both common names and types of products are included in the stem of the item provided by the CDC. Finally, a trained volunteer of the PRCHN, not a representative of the school, administered the CCMSYRBS. Instructions were read
aloud to all participants including language explicitly citing a students’ participation in completing the survey as being confidential and having no impact on their academic standing.

A 2013 article in *Morbidity and Mortality Weekly Reports*, chronicled the combination and continuation of methodological studies related to the YRBS. More specifically, researchers explored evidence supporting the ongoing changes in instrument content, operational and survey procedures and overall data quality for the YRBS (CDC, 2013). Detailed among the changes associated with the YRBS have been opportunities for training and technical assistance to state and local entities to ensure the effective implementation of the YRBS beyond federally initiated efforts. This history of research and commitment to surveillance has allowed for the development of a robust system and instrument that is reliable, valid, and responsive to the health of adolescents.

Similar methodological studies have been conducted to establish the reliability and validity of the FAS II, used to assess socioeconomic status on the 2011 CCMSYRBS. The FAS II was preceded by the original Family Affluence Scale, first used in 1997. The development of the FAS scale stems in part from documented challenges in previous research studies associated with approximating socioeconomic status among adolescents. These previous studies involved the use of items in adolescent health research designed to assess parental education and economic status (Currie, Elton, Todd & Platt, 1997). In some ways, issues related to obtaining accurate estimates of socioeconomic status are similar to those previously identified related to the validity of self-reported data among adolescents. The ability to recall information about their parents’ educational or
economic status might be challenging or something about which students are completely unaware. In the initial 1997 study of the original FAS: a 98% response rate was reported for the items related to car ownership, telephone ownership, and having an unshared bedroom; a 92% response rate was reported for the item related to weekly spending money.

In 2001 and 2002 the FAS II was revised to the current format. Boyce, Torsheim, Currie & Zambon (2006) conducted one of the first validation studies of the FAS II using data collected from 162,305 students, ages 11-15, in 35 countries. A FAS II score was calculated based on a 3-point ordinal scale as low, medium, or high affluence that allowed for the creation of an index score. Researchers reported strong correlations between the composite FAS index score and county rank order as well as a kappa score of .57, indicating moderate agreement and good criterion validity (Boyce, Torsheim, Currie & Zambon, 2006). Country rank order was based on an adjusted measure of the Gross Domestic Product (GDP), a measure of a nation’s wealth. Essentially, those students reporting higher levels of affluence were from countries with higher GDP’s.

In the same study, the correlation between FAS II scores and population health indicators such as life expectancy, infant mortality, and life expectancy were also significant (Boyce, Torsheim, Currie & Zambon, 2006). This finding suggests the use of FAS II as appropriate for use in exploring relationships between adolescent health and socioeconomic status. Based on a review of studies incorporating the FAS scale between 1997 and 2001, Boyce et. al, (2006) reveal strong correlations between both individual and summary scores, and indication of the stability of the scale. To date there have not
been any FAS II studies related to test-retest reliability. Currie et. al. (2008), however, suggested that levels of agreement are likely to be high due to the objectivity of the items contained within the scale.

**Research Design and Data Collection**

Dawson and Trapp (2001, pg. 9) define cross-sectional studies as a type of research where “data is collected on a group of subjects at one time rather than over a period of time.” Cross-sectional studies are commonly used to obtain a “snapshot” that represents a profile of the sample or population under study at that specific point in time. At the national level, the Youth Risk Behavior Survey (YRBS) has been administered as part of a cross-sectional research study design that sought to explore the health risk behaviors of adolescents during a specific academic year.

The collection of YRBS data has occurred since 2001 in Cuyahoga County among both middle and high school students. The administration of 2012 CCMSYRBS occurred during the spring of 2012 under a Case Western Reserve University (CWRU) Institutional Review Board (IRB) approved protocol. Researchers at the CWRU PRCHN have established an IRB approved mechanism that allows for the management and approval of requests to use YRBS data.

This mechanism involves the completion of an independent IRB at CWRU or another affiliated academic or clinical institution. For the purpose of this study, and IRB protocol was submitted and approved by Kent State University (KSA). The second component of the process involves the completion and submission of a Data Use Agreement (DUA) to the PRCHN including an overview of the research project and
specific details about the variables of interest. Included as a part of the DUA are a series of directions related to the use, confidentiality, reporting, and dissemination of data. For this study, a DUA was completed and submitted to the PRCHN in December of 2013. Upon submission and approval of both the IRB and DUA a dataset was created and released to the responsible investigators identified in the KSU IRB protocol. A copy of the approved KSU IRB protocol and CWRU PRCHN approved DUA will be included as appendices.

Secondary Data Analysis

Research Questions

The research questions associated with this study are: grounded in a thorough review of the literature; and centered around preliminary data detailing the prevalence rates of substance use among middle school aged youth, detailed in the 2012 Cuyahoga County Middle School Youth Risk Behavior Survey Report.

Research Question 1: Is there a significant relationship between selected demographic characteristics and academic achievement in middle school aged youth? The selected demographic characteristics will include self-reported grade level, sex, race, and socioeconomic status.

Research Question 2: Is there a significant relationship between selected demographic characteristics and self-reported substance use in middle school aged youth? The selected demographics characteristics will include self-reported grade level, sex, race and socioeconomic status. Self- reported use of tobacco, alcohol, and marijuana use will be used to approximate substance use.
Research Question 3: Is there a relationship between self-reported academic achievement and lack of substance use among middle school aged youth? Self-reported use of tobacco, alcohol, and marijuana use will be used to approximate substance use.

Research Question 4: Is there a difference in academic achievement among middle school students self-reporting different types of substance use? Self-reported use of tobacco, alcohol, and marijuana use will be used to approximate different types of substance use.

Research Question 5: Is there a difference in academic achievement among middle school students self-reporting different patterns of substance use? Patterns of substance use are based on self-reported never, ever, or current use of alcohol, tobacco and/or marijuana.

Operationalizing the Variables

Table 5 summarizes the variables contained within the dataset that were analyzed to address the research questions associated with this study. The recoding of these variables was completed by the PRCHN prior to inclusion in the dataset provided for analysis. Demographic variables used as a part of this study include grade level, sex, race, and socioeconomic status (SES). The variable for grade level was based on one item that asked for the current grade level of the subjects. The following responses were possible: 6th grade; 7th grade; 8th grade; or other. Responses to this variable were recoded to include only those subjects who responded indicating that they were in either the 7th or 8th grade. The variable for sex was based on one item that asked for the sex of the subject as either female or male. There was no additional action required for this variable. The
Table 5. *Data Management and Variables in Analysis*

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<td></td>
</tr>
</tbody>
</table>

variable for race was based on two items: one item about ethnicity as Hispanic or Latino; and one item about race with response categories for American Indian or Alaskan Native, Black or African American, Native Hawaiian or other Pacific Islander, or White. These two items were transformed into one item for race with the following four categories: Black or African American; White; Hispanic; and other or Multiracial. One variable, created as a proxy measure for socio-economic status, was created from the 9-item
Family Affluence Scale II (FAS). Based on a nine-point scale the following categories were created: 0-4 low SES; 5-6 medium SES; and 7-9 high SES.

One item specific to academic achievement was included on the CCMSYRBS. The item assessed self-reported grades in school during the previous twelve months. Responses included mostly A’s, mostly B’s, mostly C’s, mostly D’s, mostly F’s, none of these grades, or not sure. This variable was transformed into a dichotomous variable including the categories of high grades and low grades. High grades were considered A’s and B’s. Low grades included those lower than a C as well as the categories of none of these grades and not sure.

A total of seven variables related to drug use were included in the dataset, including those specific to ever cigarette use, current cigarette use, ever alcohol use, current alcohol use, ever marijuana use, and current marijuana use. The final variable was an item related to current cigar use. For all of the items related to ever use, two response categories were provided, yes or no. For all of the items related to current use several response categories were provided: 0 days; 1 or 2 days; 3 to 5 days; 6 to 9 days; 10 to 19 days; 20 to 29 days; or all 30 days. For each drug category, current use was dichotomized to either yes or no. No was based on a response of 0 days. Any response not equal to zero was categorized as yes.

Table 5 identifies the variables that will be analyzed in order to test the hypotheses associated with this study. Grades, ever tobacco, current tobacco, ever alcohol, current alcohol, ever marijuana, and current marijuana will either be dependent or independent variables depending on the research question and corresponding statistical
analysis. Demographic variables will include grade level, sex, ethnicity, race, and socioeconomic status. While data related to age is available from the CCMSYRBS, the use of grade level data is being utilized in order to be consistent with and make comparisons to other state and federal YRBS reports. Socioeconomic status will be determined by an index score based on self-reported responses to 4 items of the FAS. The following variables will be included for analysis:

A. Grade Level – a demographic variable; self-reported as either (a) 6th grade, (b) 7th grade, (c) 8th grade or (d) Other; categorical variable on an ordinal scale.

B. Sex – a demographic variable; self-reported as either (a) Female or (b) Male; a categorical variable on a nominal scale.

C. Ethnicity – a demographic variable; self-reported as (a) Yes or (b) No; categorical variable on a nominal scale.

D. Race – a demographic variable; self-reported (a) American Indian or Alaskan Native, (b) Asian, (c) Black or African American; (d) Native Hawaiian or Other Pacific Islander, or (e) White; categorical variable on a nominal scale.

Subjects were instructed to select one or more responses.

E. Grades: either a demographic, dependent or independent variable; indicative of the grades within the last year; self-reported as either (a) Mostly A’s, (b) Mostly B’s, (c) Mostly C’s, (d) Mostly D’s, (e) Mostly F’s, (f) None of these grades (g) Not sure; categorical variable on an ordinal scale.

F. Socioeconomic Status: a demographic variable; self-report based on a scale of four items related to car ownership, having an unshared bedroom; vacation
travel and computer ownership; categorical variable on an ordinal scale that approximates a continuous variable on an interval scale. For car ownership potential responses were (a) No, (b) Yes, one, or (c) Yes, two or more. For unshared bedroom potential responses were (a) No or (b) Yes. For vacation travel potential responses included (a) Not at all, (b) Once, (c) Twice, or (d) More than twice. For computer ownership potential responses included (a) None, (b) One, (c) Two, or (d) More than two. All responses were added together to create a maximum possible score of 9 with higher scores being indicative of higher level of influence.

G. Ever Tobacco Use: either a dependent or independent variable; indicative of tobacco use at any point during their lifetime; self-reported as (a) Yes or (b) No; categorical variable on a nominal scale.

H. Current Tobacco Use: either a dependent or independent variable; indicative of tobacco use within the past 30 days; self-reported as (a) 0 days, (b) 1 or 2 days, (c) 3 to 5 days, (d) 6 to 9 days, (e) 10 to 19 days, (f) 20 to 29 days, or (g) all 30 days; continuous variable on a ratio scale.

I. Ever Alcohol Use: either a dependent or independent variable; indicative of alcohol use at any point during their lifetime; self-reported as (a) Yes or (b) No; categorical variable on a nominal scale.

J. Current Alcohol Use: either a dependent or independent variable; indicative of alcohol use within the past 30 days; self-reported as (a) 0 days, (b) 1 or 2 days,
(c) 3 to 5 days, (d) 6 to 9 days, (e) 10 to 19 days, (f) 20 to 29 days, or (g) all 30 days; continuous variable on a ratio scale.

K. Ever Marijuana Use: either a dependent or independent variable; indicative of marijuana use at any point during their lifetime; self-reported as (a) Yes or (b) No; categorical variable on a nominal scale.

L. Current Marijuana Use: either a dependent or independent variable; indicative of marijuana use within the past 30 days; self-reported as (a) 0 days, (b) 1 or 2 days, (c) 3 to 5 days, (d) 6 to 9 days, (e) 10 to 19 days, (f) 20 to 29 days, or (g) all 30 days; continuous variable on a ratio scale.

**Weighting of Data**

Data collected as a part of the 2012 CCMSYRBS must be analyzed in a manner that reflects the complex nature of the sampling protocol. Use of the identified CDC YRBS sampling design combined with an overall response rate of more than 60% allows for analysis of the data in a manner that reflects the entire population. For this reason, weighted data must be utilized. Weighting occurs when data collected from survey respondents are adjusted to represent the population from which the sample was drawn, resulting in what is often referred to as weighted data (Dawson & Trapp, 2001). In this instance, the data is weighted to represent all 7th and 8th grade students within the county. The use of unweighted data would only be reflective of students who completed the survey (CDC, 2013).

In a 2013 publication from the CDC designed to support state and local weighting procedures, the following four step weighting process was described:
1. Attach base weights equal for schools and students.
2. Adjust for non-participating schools.
3. Adjust for non-responding students.
4. Post stratify to known totals by grade, gender, and race/ethnicity.

The base weight for the student is equal to the inverse probability that the student is selected for the survey (CDC, 2013, pg. 3). The base weight for the school is calculated based on the probability of the school being selected, with a within school rate based on the probability of the selection of classes within each sampled school. (CDC, 2013, pg. 4) Adjustments are then made to account for biases associated for non-participating schools and non-responding students. The final adjustment is the post-stratification weighting to ensure that the weighted sample totals for both grade by gender and race-ethnicity are consistent with the population totals (Potter, 1990).

Data Analysis and Test of Hypotheses

This study examines the relationship between substance use and academic achievement among middle school aged youth. Based on the identified research questions, the null hypotheses that will be tested are provided in Table 6. Analysis of the data will occur in two phases. The first phase will involve descriptive statistics to determine the manner in which the dependent variables for substance use will be oriented (individually or as a composite variable). After determining the manner in which the dependent variables will be used, bivariate analyses will be conducted to establish associations between variables: and, multivariate analyses to examine the degree to which associations are present. A significance level of $p \leq 0.05$ will be used throughout
Table 6. Null Hypotheses and Statistical Tests

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Statistical test</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Hypothesis 1-4:</em> There is no statistically significant relationship between selected demographic characteristics and academic achievement.</td>
<td>Chi-Square</td>
</tr>
<tr>
<td><em>Hypothesis 5-28:</em> There is no statistically significant relationship between selected demographic characteristics and substance use.</td>
<td>Chi-Square</td>
</tr>
<tr>
<td><em>Hypothesis 29-32:</em> There is no statistically significant relationship between academic achievement and lack of substance use.</td>
<td>Chi-Square, Regression Test</td>
</tr>
<tr>
<td><em>Hypothesis 33-34:</em> There is no statistical difference in academic achievement among adolescents using different types of substances</td>
<td>Regression Test</td>
</tr>
<tr>
<td><em>Hypothesis 35-36:</em> There is no statistical difference in academic achievement among adolescents with different patterns of substance use</td>
<td>Regression Test</td>
</tr>
</tbody>
</table>

hypothesis testing. IBM SPSS Statistics 21 will be used to conduct the analysis of data. An additional software module will be used, SPSS Complex Samples, in order to use the appropriate weighting procedures. Specific syntax for the use of SPSS with YRBS data has been provided by the CDC (2012).
CHAPTER IV

RESULTS

The Purpose of the Study

The purpose of this study was to examine the relationship between substance use, selected demographics and academic achievement among middle school aged youth in an urban Midwestern county.

Introduction

The CCMSYRBS was a cross-sectional survey designed to assess health risk behaviors among youth. The survey was implemented based on a two-stage cluster design, with an 87.2% school response rate, 82.5% student response rate, and a combined response rate of 72.0% (PRCHN, 2012). Based on the sampling design and combined response rates, this surveillance effort yielded a sample that was representative of the entire county or population under study. Approximately 12,341 usable surveys were obtained for analysis. From these data, variables of interest including those specific to demographic characteristics, drug use, and academic achievement were compiled as part of a unique database. Upon completion and approval of an application to the Institutional Review Board (IRB) of Kent State University and a Data Use Agreement (DUA) from the Prevention Research Center for Healthy Communities (PRCHN), the data was provided for analysis. Responses collected during the 2012 Cuyahoga County Middle School Youth Risk Behavior Survey (CCMSYRBS) constitute the data pool analyzed in this study. A secondary analysis was conducted based on the identified research questions and corresponding hypotheses.
Weighting of Data

The complex sampling design implemented as part of the administration of the CCMSYRBS combined with the overall response rate meet the CDC established criteria for the use of weighted data (CDC, 2013). Use of weighted data allows for results that are reflective of the population under study (Dawson & Trapp, 2001). IBM SPSS 21 was used for analysis and contained an optional module for the weighting of complex samples. Included in the database provided for analysis were three unique variable weights for inclusion in the SPSS Analysis Preparation Wizard. The incorporation of these variables for stratum, primary sampling unit, and weight allow for the development of a SPSS Complex Samples Plan (CSP). Once the CSP was created it was referenced and applied for use with all analysis for weighted data.

Missing Data

While 12,341 useable cases were included for analysis, completed data was not provided for each case. SPSS was used to conduct a missing value analysis for the variables included in this study. Among the demographic variables included for analysis the following number of cases contained missing data: 143 (1.2%) for grade level; 79 (.6%) for sex; 268 (2.2%) for race; and 194 (1.6%) for SES. Among the variables assessing ever use of drugs, the following cases were identified for which data were missing: 1213 (9.8%) for cigarettes; 1203 (9.7%) for alcohol; and 653 (5.3%) for marijuana. Among the variables assessing current use of drugs, the following cases were identified for which data were missing: 432 (3.5%) for cigarettes; 336 (2.7%) for cigars; 568 (4.6%) for alcohol; and 488 (4.0%) for marijuana. Decisions about the management
of missing data were conducted based on the variables of interest and type of analysis. Missing data were excluded from analysis if there was not complete data available for all of the variables included in the specific analysis. As a result, there may be variation in the number of cases used to calculate frequencies.

**Operationalizing the Variables**

Additional variables were created as a part of this study based on the transformation or recoding of the variables originally included in the dataset. Table 7 describes additional variables created for inclusion in analysis.

The following variables were created and included for analysis:

1. **Ever No Drugs**: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported never use of cigarettes, alcohol, or marijuana.

2. **Current No Drugs**: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported no current use of cigarettes, alcohol, or marijuana.

3. **Ever Cigarette Only**: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported ever using cigarettes only; cases reporting ever use of alcohol and marijuana were excluded.

4. **Current Tobacco**: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of both current cigarette and cigar use created to represent current tobacco use.
Table 7. *Additional Variables for Inclusion in Analysis*

<table>
<thead>
<tr>
<th></th>
<th>Original</th>
<th>In Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Variable</td>
<td>Category</td>
</tr>
<tr>
<td><strong>Ever Drug Use Patterns</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever No Drugs</td>
<td>Dichotomous</td>
<td>r_never-ever_drug</td>
</tr>
<tr>
<td>Ever Only Cigarettes</td>
<td>Dichotomous</td>
<td>only_ev_cig</td>
</tr>
<tr>
<td>Ever Only Alcohol</td>
<td>Dichotomous</td>
<td>only_ev_alc</td>
</tr>
<tr>
<td>Ever Only Marijuana</td>
<td>Dichotomous</td>
<td>only_ev_mari</td>
</tr>
<tr>
<td>Ever Only Cigarettes and Alcohol</td>
<td>Dichotomous</td>
<td>r_never_alc_cig</td>
</tr>
<tr>
<td>Ever Only Cigarettes and Marijuana</td>
<td>Dichotomous</td>
<td>r_never_mari</td>
</tr>
<tr>
<td>Ever Only Alcohol and Marijuana</td>
<td>Dichotomous</td>
<td>r_never_alc_mari</td>
</tr>
<tr>
<td>Ever All Drugs</td>
<td>Dichotomous</td>
<td>r_never_all_drugs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever Use of Any Drug</td>
<td>Ordinal</td>
<td>ever_use_any_drug</td>
</tr>
</tbody>
</table>

| **Current Drug Use Patterns**   |                        |                       |                        |                  |
| Current No Drugs               | Dichotomous            | never_current_drugs   | 0=No 1=Yes            |
| Current Only Tobacco           | Dichotomous            | r_cur_only_tob        | 0=No 1=Yes            |
| Current Only Alcohol           | Dichotomous            | r_cur_only_alc        | 0=No 1=Yes            |
| Current Only Marijuana         | Dichotomous            | r_cur_only_mari       | 0=No 1=Yes            |
| Current Only Tobacco and Alcohol| Dichotomous           | r_cur_alco_tob        | 0=No 1=Yes            |
| Current Only Tobacco and Marijuana| Dichotomous         | r_cur_tob_mari        | 0=No 1=Yes            |
| Current Only Alcohol and Marijuana| Dichotomous          | r_cur_alco_mari       | 0=No 1=Yes            |
| Current All Drugs              | Dichotomous            | r_cur_all_drugs       | 0=No 1=Yes            |
|                                |                        |                       | 0=No Drugs 1=1Drug 2=Two Drugs 3=Three Drugs |
5. Current Tobacco Only: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported current use of tobacco only; cases reporting current use of alcohol and marijuana were excluded. Ever Alcohol Only: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported ever using alcohol only; cases reporting ever use of cigarettes and marijuana were excluded.

6. Current Alcohol Only: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported current use of alcohol only; cases reporting current use of cigarettes and marijuana were excluded.

7. Ever Marijuana Only: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported ever using marijuana only; cases reporting ever use of alcohol and cigarettes were excluded.

8. Current Marijuana Only: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported current marijuana use only; cases reporting current use of alcohol and cigarettes were excluded.

9. Ever Cigarette and Alcohol Only: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported ever using both cigarettes and alcohol only; cases reporting ever use of marijuana were excluded.

10. Current Tobacco and Alcohol Only: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported current use of both
tobacco and alcohol only; cases reporting current use of marijuana were excluded.

11. Ever Cigarette and Marijuana Only: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported ever using both cigarettes and marijuana only; cases reporting ever use of alcohol were excluded.

12. Current Tobacco and Marijuana Only: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported current use of both tobacco and marijuana only; cases reporting current use of alcohol were excluded.

13. Ever Alcohol and Marijuana Only: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported ever using both alcohol and marijuana only; cases reporting ever use of cigarettes were excluded.

14. Current Alcohol and Marijuana Only: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported current use of both alcohol and marijuana only; cases reporting current use of tobacco were excluded.

15. Ever All Drugs: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported ever use of tobacco, alcohol and marijuana.
16. Current All Drugs: a dichotomous variable coded as 0 for No and 1 for Yes; reflective of subjects that self-reported current use of tobacco, alcohol and marijuana.

17. Ever Use of Any Drug: a four category variable coded as 0 for no drug use, 1 for ever use of 1 drug, 2 for ever use of any two drugs, and 3 for ever use of all three drugs.

18. Current Use of Any Drug: a four-category variable coded as 0 for no current drug use, 1 for current use of 1 drug, 2 for current use of any two drugs, and 3 for current use of all three drugs.

**Data Analysis and Test of Hypothesis**

Univariate analysis was conducted to provide a description of individual variables. This analysis resulted in a profile of the sample based on selected demographic characteristics, drug use, and academic achievement. Both weighted and unweighted data were used for univariate analysis. Bivariate analysis was conducted to assess the relationship among two variables including:

- selected demographic characteristics and academic achievement
- selected demographics and ever drug use
- selected demographics and current drug use
- non-drug use and academic achievement.

Bivariate analysis Chi-square tests for independence were conducted and were significant at p \leq .05. Multi-variate analysis was conducted to explore the relationship between variables based on significant associations from the bivariate analysis. Complex samples
logistic regression was conducted to determine odds ratios and account for demographic characteristics. The demographic characteristics included in the analysis were grade level, sex, race, and socioeconomic status. Multivariate analysis was significant at p≤.05. Weighted data was used for bivariate and multivariate analysis.

**Descriptive Statistics**

**Sample Demographics**

Approximately 12,341 subjects are included in the database under study. Unweighted frequencies and percentages for the demographic variables of grade level, sex, race, and socioeconomic status were calculated to describe the sample (Table 8). The data reveal relatively even percentages of both 7th and 8th grade students (47.0% for 7th grade and 53.0% for 8th grade) and female and male students (50.3% female and 49.7% male). Among those students who completed the survey, nearly 40% of the sample was White, followed closely by 34% Black, and equal rates of both Hispanic and other or multiracial groups at 13.2% each. The majority of the students were categorized as high SES (44.1%), with 31.4% categorized as medium SES, and 24.4% as low SES.

**Dependent and Independent Variables**

Weighted frequencies for drug use included ever use of cigarettes, alcohol, and marijuana are provided in Table 9. Ever use reflected use of the identified drug at some point during their lifetime. Ever use of cigarettes included the caveat of even one or two puffs. Ever use of alcohol excluded drinking a few sips for religious purposes for alcohol use. There were no stipulations included for the item assessing ever use of marijuana.
Table 8. Descriptive Statistics of Demographic Characteristics

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>7th grade</td>
<td>47.0</td>
<td>5732</td>
<td>49.0</td>
<td>11451</td>
</tr>
<tr>
<td>8th grade</td>
<td>53.0</td>
<td>6466</td>
<td>51.0</td>
<td>11934</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>50.3</td>
<td>6166</td>
<td>47.4</td>
<td>11145</td>
</tr>
<tr>
<td>Male</td>
<td>49.7</td>
<td>6096</td>
<td>52.6</td>
<td>12366</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>34.1</td>
<td>4121</td>
<td>40.3</td>
<td>9323</td>
</tr>
<tr>
<td>White</td>
<td>39.5</td>
<td>4773</td>
<td>53.9</td>
<td>12466</td>
</tr>
<tr>
<td>Hispanic</td>
<td>13.2</td>
<td>1590</td>
<td>4.1</td>
<td>958</td>
</tr>
<tr>
<td>Other/Multiracial</td>
<td>13.2</td>
<td>1589</td>
<td>1.6</td>
<td>362</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>SES</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
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</thead>
<tbody>
<tr>
<td>Low</td>
<td>24.4</td>
<td>2969</td>
<td>22.2</td>
<td>5193</td>
</tr>
<tr>
<td>Medium</td>
<td>31.4</td>
<td>3820</td>
<td>31.2</td>
<td>7286</td>
</tr>
<tr>
<td>High</td>
<td>44.1</td>
<td>5358</td>
<td>46.6</td>
<td>10873</td>
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</tbody>
</table>

Table 9. Descriptive Statistics of Dependent and Independent Variables

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Unweighted</th>
<th>Weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Drug Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarette</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever</td>
<td>10.1</td>
<td>1123</td>
</tr>
<tr>
<td>Current</td>
<td>4.1</td>
<td>489</td>
</tr>
<tr>
<td>Cigar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>8.3</td>
<td>995</td>
</tr>
<tr>
<td>All Tobacco</td>
<td></td>
<td></td>
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<tr>
<td>Current</td>
<td>8.6</td>
<td>1008</td>
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<tr>
<td>Alcohol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever</td>
<td>30.5</td>
<td>3401</td>
</tr>
<tr>
<td>Current</td>
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<td>1262</td>
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<tr>
<td>Marijuana</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever</td>
<td>12.4</td>
<td>1444</td>
</tr>
<tr>
<td>Current</td>
<td>7.4</td>
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<tr>
<td>Academic Achievement</td>
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<tr>
<td>Grades</td>
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<td></td>
</tr>
<tr>
<td>High</td>
<td>66.9</td>
<td>8089</td>
</tr>
<tr>
<td>Low</td>
<td>33.1</td>
<td>4009</td>
</tr>
</tbody>
</table>
Approximately 8.8% of students reported ever smoking a cigarette, 27.7% ever drank alcohol, and 10.9% ever used marijuana.

Weighted frequencies for current drug use reflected use of the identified drug within the past 30 days. The CCMSYRBS contained two separate items designed to assess current tobacco use among students: one related to current cigarette use; and the other related to current cigar use. From these variables a composite variable was created reflective of current tobacco use. The rate of current cigarette use was 3.7%, current cigar use was 6.7%, and the combined rate for tobacco use was 7.2%. Current use of alcohol was reported at 9.5% and current use of marijuana was 6.5%.

One item on the CCMSYRBS was used to assess academic achievement during the previous 12 months. The majority of students reported receiving mostly A’s (36.4%), followed by mostly B’s (32.3%). Mostly C’s, mostly “D’s, and mostly F’s were reported at 17.7%, 3.8%, and 1.5% respectively. Less than 1% of students (approximately .6%) reported receiving none of these grades and 8.3% of students were not sure. The variable for academic achievement was transformed into a dichotomous variable with the category of high grades (mostly A’s and mostly B’s) and low grades (mostly C’s, mostly “D’s, mostly F’s, none of these grades, and not sure). Within these categories 68.7% reported high grades and 31.3% reported low grades.

Additional Variables for Ever and Current Drug Use Patterns

Table 10 and Table 11 provide an ever and current drug use patterns of multi-drug use. Approximately 81.7% of students reported never using cigarettes, alcohol, or marijuana. Of the remaining 18% of students, who self-reported use of cigarettes,
alcohol, or marijuana, 14.9% reported ever using one of the drugs, 2.6% reported ever using two of the drugs, and .8% reported using all of the drugs. Among students who reported using only one drug, alcohol was the drug most commonly reported (13.4%). The combination of alcohol and cigarettes was the most commonly self-reported ever use two-drug combination at 1.5%.

Approximately 84.7% of students reported no current use of tobacco, alcohol, or marijuana. Of the remaining students, who self-reported current use of cigarettes, alcohol, or marijuana, 8.6% reported ever using one of the drugs, 3.9% reported ever using two of the drugs, and 2.8% reported using all of the drugs. Among students who reported using only one drug, alcohol was the drug most commonly reported (5.2%). The combination of tobacco and marijuana was the most commonly self-reported current use two-drug combination at 1.9%.

Table 10. Descriptive Statistics for Additional Ever Use Drug Variables

<table>
<thead>
<tr>
<th>Ever Drug Use</th>
<th>Total</th>
<th>Alcohol Only</th>
<th>Cigarette Only</th>
<th>Marijuana Only</th>
<th>Alcohol and Cigarette Only</th>
<th>Alcohol and Marijuana Only</th>
<th>Cigarette and Marijuana Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>(n)</td>
<td>(n)</td>
<td>(n)</td>
<td>(n)</td>
<td>n</td>
<td>(n)</td>
<td>(n)</td>
</tr>
<tr>
<td>No Drugs</td>
<td>81.7</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>(6816)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Drug</td>
<td>14.9</td>
<td>13.4</td>
<td>.9</td>
<td>.6</td>
<td>.8</td>
<td>.5</td>
<td>.2</td>
</tr>
<tr>
<td></td>
<td>(1243)</td>
<td>(1118)</td>
<td>(74)</td>
<td>(51)</td>
<td>(1244)</td>
<td>(77)</td>
<td>(14)</td>
</tr>
<tr>
<td>2 Drugs</td>
<td>2.6</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>1.5</td>
<td>.9</td>
<td>.2</td>
</tr>
<tr>
<td></td>
<td>(215)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Drugs</td>
<td>.8</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>(65)</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Note: Based on unweighted percentages. The unweighted sample size is included.
Table 11. *Descriptive Statistics for Additional Current Drug Use Variables*

<table>
<thead>
<tr>
<th>Current Drug Use</th>
<th>Total</th>
<th>Alcohol Only</th>
<th>Tobacco Only</th>
<th>Marijuana Only</th>
<th>Alcohol and Tobacco Only</th>
<th>Alcohol and Marijuana Only</th>
<th>Tobacco and Marijuana Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>(n)</td>
<td>(n)</td>
<td>(n)</td>
<td>(n)</td>
<td>n</td>
<td>(n)</td>
<td>(n)</td>
</tr>
<tr>
<td>No Drugs</td>
<td>84.7</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>(9653)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1 Drug</td>
<td>8.6</td>
<td>5.2</td>
<td>2.1</td>
<td>1.3</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>(980)</td>
<td>(594)</td>
<td>(237)</td>
<td>(149)</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>2 Drugs</td>
<td>3.9</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>1.2</td>
<td>.8</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>(445)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>(136)</td>
<td>(94)</td>
<td>(215)</td>
</tr>
<tr>
<td>All Drugs</td>
<td>2.8</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>(315)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

Note: Based on unweighted percentages. The unweighted sample size is included.

**Summary of Descriptive Statistics**

More than 12,300 subjects were included in the study and evenly split by grade level (47.0% 7th) and sex (50.3% female). Minority groups were well represented among the sample, with Black and Hispanic students reported at a combined rate of 47.3%.

There were nearly twice as many students identifying as high socioeconomic status (44.1%) than low socioeconomic status (24.4%). More than two-thirds of the students self-reported high academic achievement (68.7%), consistent with receiving mostly A’s and B’s. The majority of students had abstained from ever or current use of alcohol, tobacco, or marijuana.

Ever and current use of alcohol, alone or in combination with other drugs was most common drug used among middle school students. Ever use of alcohol was reported among 27.7% of students, with current use reported among 9.5% of students.
More than 13% of students reported only ever using alcohol and 5.2% of students are current users of only alcohol.

Ever cigarette use was reported at 8.8%. Current tobacco use, reflective of self-reported use of either cigarettes or cigars within the past 30 days was reported among 7.2% of students. The reported rate of current use of cigars was higher than that of cigarettes. Current use of tobacco and marijuana only (1.9%) was the only current two-drug category of use that exceeded the other categories containing alcohol. Ever use of marijuana use was reported at nearly 11%.

**Analysis of Hypothesis for Research Question 1**

**Hypothesis 1**

Null Hypothesis 1: There is no statistically significant relationship between grade level and academic achievement in middle school aged youth.

Alternate Hypothesis 1: There is a statistically significant relationship between grade level and academic achievement in middle school aged youth.

The relationship between grade level and academic achievement was analyzed using the Chi-square test for independence. All expected cell frequencies were greater than five. Approximately 31.0% of 7th grade students reported low grades while 31.3% of their 8th grade counterparts reported having received a low grade. Approximately 69.0% of 7th grade students reported high grades compared to 68.7% of 8th grade students. Findings from the Chi-square analysis reveals that there is not a statistically significant relationship between grade level and academic achievement, $\chi^2 (1) = .146, p = .847$. Based on this result the null hypothesis is accepted. There is not an association
between grade level and academic achievement. Table 12 summarizes the results of this Chi-square test for independence.

**Hypothesis 2**

Null Hypothesis 2: There is no statistically significant relationship between sex and academic achievement in middle school aged youth.

Alternate Hypothesis 2: There is a statistically significant relationship between sex and academic achievement in middle school aged youth.

**Table 12. Chi-square Tests for the Relationship Between Selected Demographics and Academic Achievement**

<table>
<thead>
<tr>
<th></th>
<th>High Grades</th>
<th>Low Grades</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grade Level</strong></td>
<td></td>
<td></td>
<td>.847</td>
</tr>
<tr>
<td>7th</td>
<td>69.0% (3743)</td>
<td>31.0% (1861)</td>
<td></td>
</tr>
<tr>
<td>8th</td>
<td>68.7% (4286)</td>
<td>31.3% (2081)</td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Female</td>
<td>72.8% (4284)</td>
<td>27.2% (1770)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>65.1% (3771)</td>
<td>34.9% (2207)</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Black</td>
<td>52.7% (2109)</td>
<td>47.3% (1920)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>81.2% (3890)</td>
<td>18.8% (852)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>58.2% (882)</td>
<td>41.8% (655)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>62.3% (1039)</td>
<td>37.3% (507)</td>
<td></td>
</tr>
<tr>
<td><strong>SES</strong></td>
<td></td>
<td></td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Low</td>
<td>47.4% (1386)</td>
<td>52.6% (1519)</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>65.4% (2415)</td>
<td>34.6% (1339)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>78.8% (4076)</td>
<td>21.2% (1208)</td>
<td></td>
</tr>
</tbody>
</table>

The relationship between sex and academic achievement was analyzed using the chi-square test for independence. All expected cell frequencies were greater than five.
Approximately 27.2% of female students reported low grades while 34.9% of their male counterparts reported having received a low grade. 72.8% of female students reported high grades compared to 65.1% of male students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between sex and academic achievement, $\chi^2(1) = 82.403, p < .001$. Based on this result, null hypothesis 2 is rejected. There is an association between sex and academic achievement. Table 12 summarizes the results of this Chi-square test for independence.

**Hypothesis 3**

Null Hypothesis 3: There is no statistically significant relationship between race and academic achievement in middle school aged youth.

Alternate Hypothesis 3: There is a statistically significant relationship between race and academic achievement in middle school aged youth.

A chi-square test for independence was conducted to assess the relationship between race and academic achievement. All expected cell frequencies were greater than five. High academic achievement was reported among 81.2% of White students, 52.7% of Black students, 58.2% of Hispanic students, and 62.3% of other students. Low academic achievement was reported among 18.8% of White students, 47.3% of Black students, 41.8% of Hispanic students, and 37.3% of other students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between race and academic achievement, $\chi^2 (1) = 1061.098, p < .001$. Based on this result, null hypothesis 3 is rejected. There is an association between race and academic achievement.

Table 12 summarizes the results of this Chi-square test for independence.
**Hypothesis 4**

Null Hypothesis 4: There is no statistically significant relationship between socioeconomic status and academic achievement in middle school aged youth.

Alternate Hypothesis 4: There is a statistically significant relationship between socioeconomic status and academic achievement in middle school aged youth.

A Chi-square test for independence was conducted between socioeconomic status and academic achievement. All expected cell frequencies were greater than five. Among students who reported low SES, 52.6% received low grades and 47.4% received high grades. Among students who reported medium SES, 34.6% received low grades and 65.4% received high grades. Among students who reported high SES, 21.2% received low grades and 78.8% received high grades. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between SES and academic achievement, \( \chi^2 (1) = 603.827, p < .001 \). Based on this result, null hypothesis 4 is rejected. There is an association between socioeconomic status and academic achievement. Table 12 summarizes the results of this Chi-square test for independence.

**Analysis of Hypothesis for Research Question 2**

**Hypothesis 5**

Null Hypothesis 5: There is not a statistically significant relationship between grade level and ever use of cigarettes in middle school aged youth.

Alternative Hypothesis 5: There is a statistically significant relationship between grade level and ever use of cigarettes in middle school aged youth.
A Chi-square test for independence was conducted between grade level and ever use of cigarettes. All expected cell frequencies were greater than five. Self-reported ever use of cigarettes was reported among 6.3% of 7th grade students and 10.6% of 8th grade students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between grade level and ever use of cigarettes, $\chi^2 (1) = 66.695, p < .001$. Based on this result, null hypothesis 5 is rejected. There is an association between grade level and ever use of cigarettes. Table 13 summarizes the results of this Chi-square test for independence.

**Hypothesis 6**

Null Hypothesis 6: There is not a statistically significant relationship between grade level and ever use of alcohol in middle school aged youth.

Alternative Hypothesis 6: There is a statistically significant relationship between grade level and ever use of alcohol in middle school aged youth.

A Chi-square test for independence was conducted between grade level and ever use of alcohol. All expected cell frequencies were greater than five. Self-reported ever use of alcohol was reported among 23.3% of 7th grade students and 31.4% of 8th grade students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between grade level and ever use of alcohol, $\chi^2 (1) = 90.145, p < .001$. Based on this result, null hypothesis 6 is rejected. There is an association between grade level and ever use of alcohol. Table 13 summarizes the results of this Chi-square test for independence.
Hypothesis 7

Null Hypothesis 7: There is not a statistically significant relationship between grade level and ever use of marijuana in middle school aged youth.

Alternative Hypothesis 7: There is a statistically significant relationship between grade level and ever use of marijuana in middle school aged youth.

A Chi-square test for independence was conducted between grade level and ever use of marijuana. All expected cell frequencies were greater than five. Self-reported ever use of marijuana was reported among 7.3% of 7th grade students and 13.8% of 8th grade students. Findings from the Chi-square analysis reveal that there is a statistically

Table 13. Chi-square Tests for the Relationship Between Selected Demographics and Ever Drug Use

<table>
<thead>
<tr>
<th></th>
<th>Ever Cigarette</th>
<th></th>
<th>Ever Alcohol</th>
<th></th>
<th>Ever Marijuana</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (n)</td>
<td>p</td>
<td>% (n)</td>
<td>p</td>
<td>% (n)</td>
<td>p</td>
</tr>
<tr>
<td>Grade Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7th</td>
<td>6.3% (406)</td>
<td>&lt;.001</td>
<td>23.3% (1350)</td>
<td>&lt;.001</td>
<td>7.3% (451)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>8th</td>
<td>10.6% (678)</td>
<td></td>
<td>31.4% (1991)</td>
<td></td>
<td>13.8% (951)</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>8.2% (545)</td>
<td>.104</td>
<td>27.7% (1765)</td>
<td>.947</td>
<td>8.5% (614)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Male</td>
<td>9.3% (571)</td>
<td></td>
<td>27.8% (1619)</td>
<td></td>
<td>13.1% (819)</td>
<td></td>
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<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>9.5% (354)</td>
<td>&lt;.001</td>
<td>35.8% (1315)</td>
<td>&lt;.001</td>
<td>14.7% (597)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>White</td>
<td>7.5% (340)</td>
<td></td>
<td>21.3% (973)</td>
<td></td>
<td>7.6% (341)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>18.4% (234)</td>
<td></td>
<td>42.5% (606)</td>
<td></td>
<td>7.4% (274)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>12.2% (173)</td>
<td></td>
<td>27.1% (457)</td>
<td></td>
<td>13.7% (210)</td>
<td></td>
</tr>
<tr>
<td>SES</td>
<td></td>
<td>&lt;.001</td>
<td></td>
<td>&lt;.001</td>
<td></td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Low</td>
<td>12.2% (364)</td>
<td></td>
<td>32.3% (938)</td>
<td></td>
<td>14.0% (452)</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>9.9% (394)</td>
<td></td>
<td>29.8% (1155)</td>
<td></td>
<td>12.3% (497)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>6.4% (345)</td>
<td></td>
<td>24.0% (1255)</td>
<td></td>
<td>8.3% (464)</td>
<td></td>
</tr>
</tbody>
</table>
significant relationship between grade level and ever use of marijuana, \( \chi^2 (1) = 126.398, p < .001 \). Based on this result, null hypothesis 7 is rejected. There is an association between grade level and ever use of marijuana. Table 13 summarizes the results of this Chi-square test for independence.

**Hypothesis 8**

Null Hypothesis 8: There is not a statistically significant relationship between sex and ever use of a cigarette in middle school aged youth.

Alternative Hypothesis 8: There is a statistically significant relationship between sex and ever use of a cigarette in middle school aged youth.

A Chi-square test for independence was conducted between sex and ever use of cigarettes. All expected cell frequencies were greater than five. Self-reported ever use of cigarettes was reported among 8.2% of female students and 9.3% of male students. Findings from the Chi-square analysis reveal that there is not a statistically significant relationship between sex and ever use of cigarettes, \( \chi^2 (1) = 4.149, p = .104 \). Based on this result, null hypothesis 8 is accepted. There is not an association between sex and ever use of cigarettes. Table 13 summarizes the results of this Chi-square test for independence.

**Hypothesis 9**

Null Hypothesis 9: There is not a statistically significant relationship between sex and ever use of alcohol in middle school aged youth.

Alternative Hypothesis 9: There is a statistically significant relationship between sex and ever use of alcohol in middle school aged youth.
A Chi-square test for independence was conducted between sex and ever use of alcohol. All expected cell frequencies were greater than five. Self-reported ever use of alcohol was reported among 27.7% of female students and 27.8% of male students. Findings from the Chi-square analysis reveal that there is not a statistically significant relationship between sex and ever use of alcohol, $\chi^2 (1) = .007, p = .947$. Based on this result, null hypothesis 9 is accepted. There is not an association between sex and ever use of alcohol. Table 13 summarizes the results of this Chi-square test for independence.

**Hypothesis 10**

Null Hypothesis 10: There is not a statistically significant relationship between sex and ever use of marijuana in middle school aged youth.

Alternative Hypothesis 10: There is a statistically significant relationship between sex and ever use of marijuana in middle school aged youth.

A Chi-square test for independence was conducted between sex and ever use of marijuana. All expected cell frequencies were greater than five. Self-reported ever use of marijuana was reported among 8.5% of female students and 13.1% of male students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between sex and ever use of marijuana, $\chi^2 (1) = 64.321, p < .001$ Based on this result, null hypothesis 10 is rejected. There is an association between sex and ever use of marijuana. Table 13 summarizes the results of this Chi-square test for independence.
Hypothesis 11

Null Hypothesis 11: There is not a statistically significant relationship between race and ever use of a cigarette in middle school aged youth.

Alternative Hypothesis 11: There is a statistically significant relationship between race and ever use of a cigarette in middle school aged youth.

A Chi-square test for independence was conducted between race and ever use of cigarettes. All expected cell frequencies were greater than five. Self-reported ever use of cigarettes was reported among 9.5% of Black students, 7.5% of White students, 18.4% of Hispanic students, and 12.2% of other students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between race and ever use of cigarettes, $\chi^2 (1) = 68.612, p < .001$. Based on this result, null hypothesis 11 is rejected. There is an association between race and ever use of cigarettes. Table 13 summarizes the results of this Chi-square test for independence.

Hypothesis 12

Null Hypothesis 12: There is not a statistically significant relationship between race and ever use of alcohol in middle school aged youth.

Alternative Hypothesis 12: There is a statistically significant relationship between race and ever use of alcohol in middle school aged youth.

A Chi-square test for independence was conducted between race and ever use of alcohol. All expected cell frequencies were greater than five. Self-reported ever use of alcohol was reported among 35.8% of Black students, 21.3% of White students, 42.5% of Hispanic students, and 27.1% of other students. Findings from the Chi-square analysis
reveal that there is a statistically significant relationship between race and ever use of cigarettes, \( \chi^2 (1) = 309.298, p < .001 \). Based on this result, null hypothesis 12 is rejected. There is an association between race and ever use of alcohol. Table 13 summarizes the results of this Chi-square test for independence.

**Hypothesis 13**

Null Hypothesis 13: There is not a statistically significant relationship between race and ever use of marijuana in middle school aged youth.

Alternative Hypothesis 13: There is a statistically significant relationship between race and ever use of marijuana in middle school aged youth.

A Chi-square test for independence was conducted between race and ever use of marijuana. All expected cell frequencies were greater than five. Self-reported ever use of marijuana was reported among 14.7% of Black students, 7.6% of White students, 7.4% of Hispanic students, and 13.7% of other students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between race and ever use of marijuana, \( \chi^2 (1) = 177.022, p < .001 \). Based on this result, null hypothesis 13 is rejected. There is an association between race and ever use of marijuana. Table 13 summarizes the results of this Chi-square test for independence.

**Hypothesis 14**

Null Hypothesis 14: There is not a statistically significant relationship between socioeconomic status and ever use of a cigarette in middle school aged youth.

Alternative Hypothesis 14: There is a statistically significant relationship between socioeconomic status and ever use of a cigarette in middle school aged youth.
A Chi-square test for independence was conducted between socioeconomic status and ever use of a cigarette. All expected cell frequencies were greater than five. Self-reported ever use of a cigarette was reported among 12.2% of low SES students, 9.9% of medium SES students, and 6.4% of high SES students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between SES and ever smoking a cigarette, $\chi^2 (1) = 76.281, p < .001$. Based on this result, null hypothesis 14 is rejected. There is an association between socioeconomic status and ever use of cigarettes. Table 13 summarizes the results of this Chi-square test for independence.

**Hypothesis 15**

Null Hypothesis 15: There is not a statistically significant relationship between socioeconomic status and ever drinking alcohol in middle school aged youth.

Alternative Hypothesis 15: There is a statistically significant relationship between socioeconomic status and ever drinking alcohol in middle school aged youth.

A Chi-square test for independence was conducted between socioeconomic status and ever drinking alcohol. All expected cell frequencies were greater than five. Self-reported ever use of alcohol was reported among 32.3% of low SES students, 29.8% of medium SES students, and 24.0% of high SES students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between SES and ever drinking alcohol, $\chi^2 (1) = 67.785, p < .001$. Based on this result, null hypothesis 15 is rejected. There is not an association between socioeconomic status and ever use of alcohol. Table 13 summarizes the results of this Chi-square test for independence.
Hypothesis 16

Null Hypothesis 16: There is not a statistically significant relationship between socioeconomic status and ever using marijuana in middle school aged youth.

Alternative Hypothesis 16: There is a statistically significant relationship between socioeconomic status and ever using marijuana in middle school aged youth.

A Chi-square test for independence was conducted between socioeconomic status and ever using marijuana. All expected cell frequencies were greater than five. Self-reported ever use of marijuana was reported among 14.0% of low SES students, 12.3% of medium SES students, and 8.3% of high SES students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between SES and ever using marijuana, $\chi^2 (1) = 69.207, p < .001$. Based on this result, null hypothesis 16 is rejected. There is not an association between socioeconomic status and ever use of marijuana. Table 14 summarizes the results of this Chi-square test for independence.

Hypothesis 17

Null Hypothesis 17: There is not a statistically significant relationship between grade level and current use of tobacco in middle school aged youth.

Alternative Hypothesis 17: There is a statistically significant relationship between grade level and current use of tobacco in middle school aged youth.

A Chi-square test for independence was conducted between grade level and current use of tobacco. All expected cell frequencies were greater than five. Self-reported current use of tobacco was reported among 5.5% of 7th grade students and 8.3% of 8th grade students. Findings from the Chi-square analysis reveal that there is a
statistically significant relationship between grade level and current tobacco use, $\chi^2 (1) = 35.444, p < .001$. Based on this result, null hypothesis 17 is rejected. There is an association between grade level and current use of tobacco, including cigarette and cigar use. Table 14 summarizes the results of this Chi-square test for independence.

<table>
<thead>
<tr>
<th></th>
<th>Tobacco</th>
<th></th>
<th>Alcohol</th>
<th></th>
<th>Marijuana</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (n)</td>
<td>p</td>
<td>% (n)</td>
<td>p</td>
<td>% (n)</td>
<td>p</td>
</tr>
<tr>
<td><strong>Grade Level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7th</td>
<td>5.5% (361)</td>
<td>&lt; .001</td>
<td>7.2% (465)</td>
<td>&lt; .001</td>
<td>4.0% (265)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>8th</td>
<td>8.3% (610)</td>
<td></td>
<td>11.2% (760)</td>
<td></td>
<td>8.3% (578)</td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>6.4% (480)</td>
<td>.012</td>
<td>9.7% (683)</td>
<td>.546</td>
<td>5.0% (373)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Male</td>
<td>7.8% (516)</td>
<td></td>
<td>9.2% (570)</td>
<td></td>
<td>7.8% (498)</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>10.4% (434)</td>
<td>&lt; .001</td>
<td>10.7% (426)</td>
<td>&lt; .001</td>
<td>9.0% (372)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>4.3% (212)</td>
<td></td>
<td>7.9% (369)</td>
<td></td>
<td>4.4% (210)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>14.8% (210)</td>
<td></td>
<td>19.2% (266)</td>
<td></td>
<td>11.9% (159)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>9.4% (138)</td>
<td>&lt; .001</td>
<td>11.3% (185)</td>
<td>&lt; .001</td>
<td>8.9% (128)</td>
<td></td>
</tr>
<tr>
<td><strong>SES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>10.2% (325)</td>
<td>&lt; .001</td>
<td>10.5% (328)</td>
<td>.075</td>
<td>9.0% (281)</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>8.1% (347)</td>
<td></td>
<td>9.8% (411)</td>
<td></td>
<td>7.3% (295)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>5.1% (316)</td>
<td></td>
<td>8.7% (503)</td>
<td></td>
<td>4.8% (289)</td>
<td></td>
</tr>
</tbody>
</table>

**Hypothesis 18**

Null Hypothesis 18: There is not a statistically significant relationship between grade level and current use of alcohol in middle school aged youth.

Alternative Hypothesis 18: There is a statistically significant relationship between grade level and current use of alcohol in middle school aged youth.
A Chi-square test for independence was conducted between grade level and current use of alcohol. All expected cell frequencies were greater than five. Self-reported current use of alcohol was reported among 7.2% of 7th grade students and 11.2% of 8th grade students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between grade level and current alcohol use, $\chi^2 (1) = 56.229, p < 001$. Based on this result, null hypothesis 18 is rejected. There is an association between grade level and current use of alcohol. Table 15 summarizes the results of this Chi-square test for independence.

Table 15. *Chi-Square Test for the Relationship Between Non Drug Use and Academic Achievement*

<table>
<thead>
<tr>
<th>Non-Drug Use</th>
<th>High % (n)</th>
<th>Low % (n)</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Ever Drug Use</td>
<td>77.2% (5253)</td>
<td>22.8% (1644)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>No Current Drug Use</td>
<td>72.8% (6718)</td>
<td>27.2% (2681)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Note: Based on weighted percentages. The unweighted sample size is included.

**Hypothesis 19**

Null Hypothesis 19: There is not a statistically significant relationship between grade level and current use of marijuana in middle school aged youth.

Alternative Hypothesis 19: There is a statistically significant relationship between grade level and current use of marijuana in middle school aged youth.

A Chi-square test for independence was conducted between grade level and current use of marijuana. All expected cell frequencies were greater than five. Self-
reported current use of marijuana was reported among 4.0% of 7th grade students and 8.3% of 8th grade students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between grade level and current marijuana use, \( \chi^2 (1) = 93.424, p < 0.001 \). Based on this result, null hypothesis 19 is rejected. There is an association between grade level and current use of marijuana. Table 14 summarizes the results of this Chi-square test for independence.

**Hypothesis 20**

Null Hypothesis 20: There is not a statistically significant relationship between sex and current use of tobacco in middle school aged youth.

Alternative Hypothesis 20: There is a statistically significant relationship between sex and current use of tobacco in middle school aged youth.

A Chi-square test for independence was conducted between sex and current use of tobacco. All expected cell frequencies were greater than five. Self-reported current use of tobacco was reported among 6.4% of female students and 7.8% of male students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between sex and current tobacco use, \( \chi^2 (1) = 8.410, p = 0.012 \). Based on this result, null hypothesis 20 is rejected. There is an association between sex and current use of tobacco, including cigarettes and cigars. Table 14 summarizes the results of this Chi-square test for independence.

**Hypothesis 21**

Null Hypothesis 21: There is not a statistically significant relationship between sex and current use of alcohol in middle school aged youth.
Alternative Hypothesis 21: There is a statistically significant relationship between sex and current use of alcohol in middle school aged youth.

A Chi-square test for independence was conducted between sex and current use of alcohol. All expected cell frequencies were greater than five. Self-reported current use of alcohol was reported among 9.7% of female students and 9.2% of male students. Findings from the Chi-square analysis reveal that there is not a statistically significant relationship between sex and current alcohol use, \( \chi^2 (1) = .596, p = .546 \). Based on this result, null hypothesis 21 is accepted. There is not an association between sex and current use of alcohol. Table 14 summarizes the results of this Chi-square test for independence.

**Hypothesis 22**

Null Hypothesis 22: There is not a statistically significant relationship between sex and current use of marijuana in middle school aged youth.

Alternative Hypothesis 22: There is a statistically significant relationship between sex and current use of marijuana in middle school aged youth.

A Chi-square test for independence was conducted between sex and current use of marijuana. All expected cell frequencies were greater than five. Self-reported current use of marijuana was reported among 5.0% of female students and 7.8% of male students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between sex and current marijuana use, \( \chi^2 (1) = 39.982, p < .001 \). Based on this result, null hypothesis 22 is rejected. There is an association sex and current use of marijuana. Table 14 summarizes the results of this Chi-square test for independence.


**Hypothesis 23**

Null Hypothesis 23: There is not a statistically significant relationship between race and current use of tobacco in middle school aged youth.

Alternative Hypothesis 23: There is a statistically significant relationship between race and current use of tobacco in middle school aged youth.

A Chi-square test for independence was conducted between race and current use of tobacco. All expected cell frequencies were greater than five. Self-reported current use of tobacco was reported among 10.4% of Black students, 4.3% of White students, 14.8% of Hispanic students, and 9.4% of other and multiracial students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between race and current tobacco use, \( \chi^2 (1) = 194.278, p < .001 \). Based on this result, null hypothesis 23 is rejected. There is an association between race and current use of tobacco, including cigarettes and cigars. Table 14 summarizes the results of this Chi-square test for independence.

**Hypothesis 24**

Null Hypothesis 24: There is not a statistically significant relationship between race and current use of alcohol in middle school aged youth.

Alternative Hypothesis 24: There is a statistically significant relationship between race and current use of alcohol in middle school aged youth.

A Chi-square test for independence was conducted between race and current use of alcohol. All expected cell frequencies were greater than five. Self-reported current use of alcohol was reported among 10.7% of Black students, 7.9% of White students,
19.2% of Hispanic students, and 11.3% of other and multiracial students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between race and current alcohol use, \( \chi^2 (1) = 76.676, p < .001 \). Based on this result, null hypothesis 24 is rejected. There is an association between race and current use of alcohol. Table 14 summarizes the results of this Chi-square test for independence.

**Hypothesis 25**

Null Hypothesis 25: There is not a statistically significant relationship between race and current use of marijuana in middle school aged youth.

Alternative Hypothesis 25: There is a statistically significant relationship between race and current use of marijuana in middle school aged youth.

A Chi-square test for independence was conducted between race and current use of marijuana. All expected cell frequencies were greater than five. Self-reported current use of marijuana was reported among 9.0% of Black students, 4.4% of White students, 11.9% of Hispanic students, and 8.9% of other and multiracial students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between race and current marijuana use, \( \chi^2 (1) = 116.662, p < .001 \). Based on this result, null hypothesis 25 is rejected. There is an association between race and current use of marijuana. Table 14 summarizes the results of this Chi-square test for independence.

**Hypothesis 26**

Null Hypothesis 26: There is not a statistically significant relationship between SES and current use of tobacco in middle school aged youth.
Alternative Hypothesis 26: There is a statistically significant relationship between SES and current use of tobacco in middle school aged youth.

A Chi-square test for independence was conducted between SES and current use of tobacco. All expected cell frequencies were greater than five. Self-reported current use of tobacco was reported among 10.2% of low SES students, 8.1% of medium SES students, and 5.1% of high SES students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between SES and current tobacco use, \( \chi^2 (1) = 75.121, p < .001 \). Based on this result, null hypothesis 26 is rejected. There is an association between socioeconomic status and current use of tobacco, including cigarettes and cigars. Table 14 summarizes the results of this Chi-square test for independence.

**Hypothesis 27**

Null Hypothesis 27: There is not a statistically significant relationship between SES and current use of alcohol in middle school aged youth.

Alternative Hypothesis 27: There is a statistically significant relationship between SES and current use of alcohol in middle school aged youth.

A Chi-square test for independence was conducted between SES and current use of alcohol. All expected cell frequencies were greater than five. Self-reported current use of alcohol was reported among 10.5% of low SES students, 9.8% of medium SES students, and 8.7% of high SES students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between SES and current alcohol use, \( \chi^2 (1) = 7.420, p = .075 \). There is not an association between socioeconomic status and
current use of alcohol. Based on this result, null hypothesis 27 is accepted. Table 14 summarizes the results of this Chi-square test for independence.

**Hypothesis 28**

Null Hypothesis 28: There is not a statistically significant relationship between SES and current use of marijuana in middle school aged youth.

Alternative Hypothesis 28: There is a statistically significant relationship between SES and current use of marijuana in middle school aged youth.

A Chi-square test for independence was conducted between SES and current use of marijuana. All expected cell frequencies were greater than five. Self-reported current use of marijuana was reported among 9.0% of low SES students, 7.3% of medium SES students, and 4.8% of high SES students. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between SES and current marijuana use, $\chi^2 (1) = 57.796$, $p < .001$. Based on this result, null hypothesis 28 is rejected. There is an association between socioeconomic status and current use of marijuana. Table 14 summarizes the results of this Chi-square test for independence.

**Analysis of Hypothesis for Research Question 3**

**Hypothesis 29**

Null Hypothesis 29: There is not a statistically significant relationship between never using alcohol, cigarettes, or marijuana and academic achievement in middle school aged youth.
Alternative Hypothesis 29: There is a statistically significant relationship between never using alcohol, tobacco, or marijuana and academic achievement in middle school aged youth.

A Chi-square test for independence was conducted between never use of alcohol, cigarettes, or marijuana and academic achievement. All expected cell frequencies were greater than five. Self-reported combined never use of alcohol, cigarettes, or marijuana was reported by 77.2% of high academic achievers and 22.8% of low academic achievers. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between never use of alcohol, cigarettes, or marijuana and academic achievement, $\chi^2 (1) = 405.522, p <.001$. Based on this result, null hypothesis 29 is rejected. There is an association between never use of alcohol, cigarettes, or marijuana and academic achievement. Table 15 summarizes the results of this Chi-square test for independence.

**Hypothesis 30**

Null Hypothesis 30: There is not a statistically significant relationship between no current use of alcohol, tobacco, or marijuana and academic achievement in middle school aged youth.

Alternative Hypothesis 30: There is a statistically significant relationship between no current use of alcohol, tobacco, or marijuana and academic achievement in middle school aged youth.

A Chi-square test for independence was conducted between no current use of alcohol, tobacco, or marijuana and academic achievement. All expected cell frequencies
were greater than five. Self-reported combined never use of alcohol, tobacco, or marijuana was reported by 72.8% of high academic achievers and 27.2% of low academic achievers. Findings from the Chi-square analysis reveal that there is a statistically significant relationship between no current use of alcohol, tobacco, or marijuana and academic achievement, $\chi^2 (1) = 301.465, p < .001$. Based on this result, null hypothesis 30 is rejected. There is an association between no current use of alcohol, cigarettes, or marijuana and academic achievement. Table 15 summarizes the results of this Chi-square test for independence.

**Hypothesis 31**

Null Hypothesis 31: Never using drugs is not associated with academic achievement.

Alternative Hypothesis 31: Never using drugs is associated with academic achievement.

A complex samples logistic regression was performed to assess the impact of never drug use and a number of other factors on academic achievement. The model contained five independent variables (never use, grade level, sex, race, and socioeconomic status). The full model was statistically significant, Wald $X^2 (8, N=7912) = 687.051, p< .001$, indicating that the model was able to distinguish between respondents who reported high and low academic achievement. The model as a whole explained between 13.2% (Cox and Snell R square) and 19.5% (Nagelkerke R square) of the variance in academic achievement, and correctly classified 75.5% of cases. All of the independent variables made a unique statistically significant contribution to the model
(p<.001) with the exception of grade level (p=.395). The relationship between no current drug use and high academic achievement was associated with an odds ratio of 2.0 when compared to low academic achievers. High academic achievers are more than 2 times more likely to be never drug users when compared to their low academic achieving counterparts. Based on this result of the complex samples logistic regression, the null hypothesis is rejected. There is an association between never drug use and academic achievement. Table 16 summarizes the results of this complex samples logistic regression.

Table 16. Adjusted Odd Ratios for Non Drug Use and High Academic Achievement

<table>
<thead>
<tr>
<th>Academic Achievement</th>
<th>OR</th>
<th>CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Drug Use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Ever Drug Use</td>
<td>2.017</td>
<td>1.734 – 2.347</td>
<td>.018</td>
</tr>
<tr>
<td>No Current Drug Use</td>
<td>2.100</td>
<td>1.787 – 2.469</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Note: Odds ratios were adjusted by grade level, sex, race, and SES. The reference category is low academic achievement.

**Hypothesis 32**

Null Hypothesis 32: No current drug use is not associated with academic achievement Alternative.

Hypothesis 32: No current drug use is associated with academic achievement.

A complex samples logistic regression was performed to assess the impact of no current drug use and a number of other factors on academic achievement. The model contained five independent variables (no current use, grade level, sex, race, and socioeconomic status). The full model was statistically significant, Wald $X^2$ (8,
N=10677) = 788.33, p< .001, indicating that the model was able to distinguish between respondents who reported high and low academic achievement. The model as a whole explained between 12.4% (Cox and Snell R square) and 17.6% (Nagelkerke R square) of the variance in academic achievement, and correctly classified 71.3% of cases. All of the independent variables made a unique statistically significant contribution to the model (p<.001) with the exception of grade level (p=.272). The relationship between no current drug use and high academic achievement was associated with an odds ratio of 2.1 when compared to low academic achievers. High academic achievers are more than 2 times more likely to not be current drug users when compared to their low academic achieving counterparts. Based on this result of the complex samples logistic regression the null hypothesis is rejected. There is an association between no current drug use and academic achievement. Table 16 summarizes the results of this complex samples logistic regression.

Analysis of Hypothesis for Research Question 4

Hypothesis 33

Null Hypothesis 33: Ever use of drugs is not associated academic achievement.

Alternative Hypothesis 33: Ever use of drugs is associated with academic achievement.

A complex samples logistic regression was performed to assess the impact of ever using drugs and a number of other factors on academic achievement. The model contained seven independent variables (ever smoking, ever drinking, ever using marijuana, grade level, sex, race, and socioeconomic status). The full model was
statistically significant, Wald $X^2$ (10, N=9409) = 773.533, $p < .001$, indicating that the model was able to distinguish between respondents who reported high and low academic achievement. The model as a whole explained between 14.1% (Cox and Snell R square) and 20.3% (Nagelkerke R square) of the variance in academic achievement, and correctly classified 73.3% of cases. All of the independent variables made a unique statistically significant contribution to the model ($p < .001$) with the exception of lifetime marijuana use ($p = .386$) and grade level ($p = .821$). The strongest associations with low academic achievement were ever smoking a cigarette (OR 2.369), ever trying alcohol (OR 1.668), and ever using marijuana (OR 1.113), controlling for grade level, sex, race, and socioeconomic status. Low academic achievers are more than 2.3 times more likely to have used a cigarette, 1.7 times more likely ever drank alcohol, and 1.113 times more likely to have ever used marijuana than their high academic achieving counterparts.

Based on this result of the complex samples logistic regression, the null hypothesis is rejected. There is an association between ever use of drugs and academic achievement.

Table 17 summarizes the results of this complex samples logistic regression.

**Table 17. Adjusted Odds Ratios for Low Academic Achievement Among Any Drug Users**

<table>
<thead>
<tr>
<th>Drug Use</th>
<th>Ever OR</th>
<th>CI</th>
<th>p</th>
<th>Current OR</th>
<th>CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cigarette</td>
<td>2.369</td>
<td>1.793 – 3.131</td>
<td>&lt; .001</td>
<td>2.185</td>
<td>1.505 – 3.171</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Cigar</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>1.849</td>
<td>1.353 – 2.525</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Alcohol</td>
<td>1.668</td>
<td>1.432 – 1.942</td>
<td>&lt; .001</td>
<td>1.301</td>
<td>1.055 – 1.603</td>
<td>.014</td>
</tr>
<tr>
<td>Marijuana</td>
<td>1.113</td>
<td>.874 – 1.418</td>
<td>.386</td>
<td>1.091</td>
<td>.828 – 1.437</td>
<td>.536</td>
</tr>
</tbody>
</table>

Note: Odds ratios were adjusted by grade level, sex, race, and SES. The reference category is high academic achievement.
Hypothesis 34

Null Hypothesis 34: Current use of drugs is not associated academic achievement.

Alternative Hypothesis 34: Current use of drugs is associated with academic achievement.

A complex samples logistic regression was performed to assess the impact of current drug use and a number of other factors on academic achievement. The model contained eight independent variables (current cigarettes use, current cigar use, current alcohol use, current marijuana use, grade level, sex, race, and socioeconomic status). The full model was statistically significant, Wald $X^2(11, N=10677) = 759.848$, $p<.001$, indicating that the model was able to distinguish between respondents who reported high and low academic achievement. The model as a whole explained between 12.7% (Cox and Snell R square) and 18% (Nagelkerke R square) of the variance in academic achievement, and correctly classified 71.9% of cases. Approximately 5 of the independent variables made a unique statistically significant contribution to the model at $p<.001$ with the exception of current alcohol use $p = .014$. The other exceptions were current marijuana use ($p = .536$) and grade level (.232), both of which did not make a statistically significant contribution to the model. The strongest relationships with low academic achievement were current cigarette use (OR 2.185), current cigar use (OR 1.849), current alcohol use (OR 1.301), and current marijuana use (OR 1.091), controlling for grade level, sex, race, and socioeconomic status. Based on this result of the complex samples logistic regression, the null hypothesis is rejected. There is an
association between current use of drugs and academic achievement. Table 17 summarizes the results of this complex samples logistic regression.

**Analysis of Hypothesis for Research Question 5**

**Hypothesis 35**

Null Hypothesis 35: Ever multidrug use is not associated with academic achievement.

Alternative Hypothesis 35: Ever multidrug use is associated with academic achievement.

A complex samples logistic regression was performed to assess the impact of ever drug use and a number of other factors on academic achievement. The model contained five independent variables (ever multidrug use, grade level, sex, race, and socioeconomic status). The full model was statistically significant, Wald $X^2 (10, N=7912) = 716.979$, $p<.001$, indicating that the model was able to distinguish between respondents who reported high and low academic achievement. The model as a whole explained between 13.5% (Cox and Snell R square) and 19.9% (Nagelkerke R square) of the variance in academic achievement, and correctly classified 75.5% of cases. Approximately 4 of the independent variables made a unique statistically significant contribution to the model at $p<.001$ with the exception of current grade level ($p=.447$). The strongest relationships with low academic achievement were ever 2 drug users (OR 4.234), ever 3 drug users (OR 1.993), and ever one drug users (OR 1.770), controlling for grade level, sex, race, and socioeconomic status. Based on this result of the complex samples logistic regression, the null hypothesis is rejected. There is an association between ever multi-
drug use and academic achievement. Table 18 summarizes the results of this complex
samples logistic regression.

**Hypothesis 36**

Null Hypothesis 36: Current multidrug use is not associated with academic achievement.

Alternative Hypothesis 36: Current multidrug use is associated with academic achievement.

A complex samples logistic regression was performed to assess the impact of current drug use and a number of other factors on academic achievement. The model contained five independent variables (current multidrug use, grade level, sex, race, and socioeconomic status). The full model was statistically significant, Wald $X^2 (10, N=10677) = 786.070$, $p< .001$, indicating that the model was able to distinguish between respondents who reported high and low academic achievement. The model as a whole explained between 12.5% (Cox and Snell R square) and 17.8% (Nagelkerke R square) of the variance in academic achievement, and correctly classified 71.5% of cases.

Approximately 5 of the independent variables made a unique statistically significant contribution to the model at $p<.001$ with the exception of current grade level ($p=.298$). The strongest associations with low academic achievement were current 3 drug users (OR 2.985), current 2 drug users (OR 2.570), and current one drug users (OR 1.762), controlling for grade level, sex, race, and socioeconomic status. Based on this result of the complex samples logistic regression, the null hypothesis is rejected. There is an
association between current multi-drug use and academic achievement. Table 18 summarizes the results of this complex samples logistic regression.

Table 18. Adjusted Odds Ratios for Low Academic Achievements Among Individual Drug Users

<table>
<thead>
<tr>
<th></th>
<th>Ever</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>CI</td>
</tr>
<tr>
<td>1 drug</td>
<td>1.770</td>
<td>1.492 – 2.099</td>
</tr>
<tr>
<td>2 drugs</td>
<td>4.234</td>
<td>2.879 – 6.228</td>
</tr>
<tr>
<td>3 drugs</td>
<td>1.993</td>
<td>3.014 – 5.413</td>
</tr>
</tbody>
</table>

Note: Odds ratios were adjusted by grade level, sex, race, and SES. The reference category is high academic achievement. P < .001.

**Summary**

Among the diverse respondents included in this study, there are significant relationships with both academic achievement and drug use. Sex, race, and socioeconomic status demonstrated statistically significant associations with academic achievement (all at p < .001). There was not a statistically significant relationship between grade level and academic achievement. Specifically, there was no difference in academic achievement among students in either 7th or 8th grade.

Statistically significant relationships existing between grade level, race, and socioeconomic status with ever use of cigarettes, alcohol, and marijuana. There were not, however, statistically significant relationships between sex and ever cigarette or alcohol use. Both sexes used those drugs equally. There was as statistically significant difference in the rate of female (8.5%) and male (13.1%) ever use of marijuana.

By grade level and race there were statistically significant differences in the rate of current tobacco, alcohol, and marijuana use. Neither current tobacco nor alcohol use
was significant by sex. Current marijuana use was statistically significant by sex with 5.0% of females and 7.8% of males reporting current marijuana use. Across socioeconomic status the relationship with both current tobacco use and current marijuana use were statistically significant. Current alcohol use was not significant across socioeconomic status, with 10.5% low, 9.8% medium, and 8.7% high being reported among respondents.

There was a statistically significant relationship between both ever drug use and no current drug use with academic achievement. Specifically, lack of drug use was associated with higher rates of high academic achievement. Similarly, among those students who reported high academic achievement, they were more than two times more likely to be either a never drug user (OR 2.017) or a non-current drug user (OR 2.1).

Among low academic achievers, the odds associated with ever or current drug use were higher than that of high academic achievers. This relationship was strongest for ever cigarette use (OR=2.369), current cigarette (OR=2.185) and current cigar (OR=1.849) use. Low academic achievers were also more likely to be multi-drug users than their high achieving counterparts. This relationship was strongest for ever use of any two drugs (OR=4.234) and current use of two or three drugs (OR =2.570 and OR=2.985 respectively).
CHAPTER V
DISCUSSION AND RECOMMENDATIONS

Purpose of the Study

The purpose of this study was to examine the relationship between substance use, selected demographics and academic achievement among middle school aged youth in an urban Midwestern county.

Public Health Significance

Healthy People

The Surgeon General and the United States Public Health Service introduced Healthy People in 1979 as part of a public private partnership to improve and enhance the nation’s health. Since that time, the initiative has flourished, withstanding infrastructure, social, environmental, and political challenges that could have limited its success (Green & Allegrante, 2011). The scope of the initiative has grown in response to progress in public health research and practice and in recognition of emerging trends that threaten the health of the population. The 1979 Surgeon General’s Report on Health Promotion and Disease Prevention established five broad goals related to increasing the length of life of among five life span categories including infants, children, adolescents, adults, and seniors. Currently, Healthy People 2020, includes four broad goals:

- Attain high-quality, longer lives free of preventable disease, disability, injury, and premature death.
- Achieve health equity, eliminate disparities, and improve the health of all groups.
- Create social and physical environments that promote good health for all.


Interestingly, all five of the 1990 goals are now incorporated as a part of two goals within the current framework of the initiative: one of the Healthy People 2020 goals focuses on “attaining high-quality, longer lives free of preventable disease, disability, injury, and premature death”; and the other on “promoting quality of life, healthy development, and healthy behaviors across all life stages” (DHHS, 2010, p. 32).

The influence of complex environmental factors as contributors to health has been well documented in the 1979 Surgeon General’s Report, Promoting Health/Preventing Disease: Objectives for the Nation (1980), and an ever-expanding body of literature. In fact, the 1979 Surgeon General’s Report issued a challenge to address the influence of the environment as a contributing factor to the growing burden of chronic diseases (Green & Kreuter, 1990). Today, the focus on the environment is referenced commonly as the social ecological approach. Social ecology acknowledges the personal, interpersonal, and environmental factors that contribute to health (Stokals, 1996). The social ecological approach is supported by the identification of determinants of health and has been incorporated into the Healthy People 2020 goals. In specific, Healthy People 2020, the social determinants of health have been identified as (DHHS, 2010, p.32):

- Neighborhood and built environment,

- Health and health care,
• Social and community context,
• Education, and
• Economic stability.

To that end, two specific Healthy People 2020 goals reflect the growing focus on social ecology and the social determinants of health:

• one related to “creating social and physical environments that promote good health for all”; and

• another “achieving health equity, eliminate disparities, and improve the health of all groups (DHHD, 2010, p.32). “

This is further evidence that there has been an evolution in the orientation of goals and underlying assumptions that have been a part of the Healthy People initiative since its inception. Appropriately, changes have occurred also in the overall organization and structure of the initiative accompanying this change in goals. As previously indicated, the five broad goals incorporated as a part of 1979 Surgeon’s General’s Report, were supported by 226 measurable objectives for 15 priority areas in the 1990 Objectives for the Nation. Healthy People 2020, now incorporates 4 broad goals, with more than 1200 objectives and 42 topic areas. Each successive iteration of Healthy People has been built on and uniquely leveraged the foundation upon which its predecessor was framed. To that end, there are several common themes, priority areas, and challenges that have been uniquely addressed and incorporated throughout the history of the initiative. Key to this study, have been those aspects of Healthy People that have focused on adolescents,
substance use, and data related to surveillance and monitoring the health of the population.

**Adolescence**

The incorporation of adolescents as a primary target population throughout the Healthy People initiative has been consistent, yet uniquely integrated into each successive iteration. In the *1979 Surgeon General’s Report* and the accompanying *1990 Health Objectives for the Nation*, adolescents were incorporated as a lifespan category, defined as ages 15-24. A unique goal was identified related to increasing the length of life among the age group. Specific objectives were oriented around preventive services, health protection, and health promotion and embedded across the 15 identified priority areas. Schools specifically were identified as key partner and venue for the efforts related to improving both child and adolescent health.

As a part of *Healthy People 2000*, 22 priority areas were identified. For each of these areas, specific objectives related to adolescents were included. Among these objectives, specific attention was focused on areas in which disparities within the adolescent population existed. This treatment of adolescents within *Healthy People 2000* was similar to that which would later occur as a part of *Healthy People 2010*. Within *Healthy People 2010*, areas in which health disparities existed among adolescents were highlighted as critical health objectives. Further, adolescent and young adults, as an age group category, were the focus of subsidiary programming. In this instance, the subsidiary programming related to adolescents and young adults was designed to provide supplemental support for the integration of *Healthy People 2010* at the state and
community level. This approach was introduced as an intensive effort to meet the objectives associated with these life span categories and make meaningful gains in the health of the population. 

*Healthy People 2020* now identifies adolescents as a unique topic area and defines the lifespan category more broadly, incorporating ages 10-24. In support of this topic area, there are unique objectives identified. Several objectives include a focus on educational achievement. Specifically, these objectives focus on (DHHS, 2013):

- High school graduation rates;
- Test scores in reading and math at multiple grade levels;
- School absenteeism;
- Perception of school work and meaningful and important.

Importantly, in *Healthy People 2020*, the inclusion of outcomes, specifically those related to test scores, has been integrated as a new focus within the initiative. Further, the role of schools has been included throughout *Healthy People 2020*, especially within the topic area of educational and community-based programs. Despite the current identification of a unique topic area for adolescents within *Healthy People 2020*, health issues related to adolescents are not confined within this topic area.

For the purpose of this study, the use of the *Healthy People 2020* definition of adolescence was used. This definition of adolescents includes the age range of 10-24. Interestingly, another topic area within the current iteration of the Healthy People initiative is that of early and middle childhood. In this context, early childhood was defined as birth through the age range of eight years and the parameters of middle
childhood as the age range of six through twelve years (DHHS, 2013). There is overlap between the age range provided for that of adolescents and that of middle childhood. Of specific interest to this study is the lower end of the age range specific to adolescents (10-14) and the higher end of the age range for middle childhood (10-12). This subset of the age range, represent students who can be largely found in middle school, commonly in grades six through eight and fall within the ages of ten through 14. Importantly, Healthy People 2020 identified the need to have a stronger and more robust surveillance system to provide data for and support programming for this specific subset of the population (CDC, 2013).

Across the lifespan, adolescence, remains a key developmental stage during which lifestyle and behavioral patterns are formed (SAHM, 2013). Significant physiological, cognitive, and social growth occurs during this time. Of specific importance is the ongoing development of the brain during adolescence, which influences cognitive functioning and decision-making, during a time of significant social and environmental change. This ongoing brain development has an effect on adolescent behavior and may contribute to engagement in risk behaviors. Initiation of and engagement in risk behaviors during this time has the potential to become a lifelong pattern of behavior. Lifelong engagement in any health risk behavior has the ability to impact morbidity and mortality in adulthood.

The Centers for Disease Control and Prevention (CDC) has identified six categories of risk behavior that contribute to the leading causes of morbidity and mortality in adulthood including (Kolbe, Kann & Collins, 1993):
• Unintentional and intentional injuries
• Physical activity
• Nutrition
• Sexual behaviors
• Tobacco
• Alcohol and other drugs.

While there are specific behaviors associated with each of these categories, adolescents might engage in health risk behaviors across multiple categories. Concurrently, problem behavior theory suggests that risk behaviors have a tendency to cluster, do not occur in isolation, and are not confined to any specific category of risk behavior (Botvin, 1995). For this reason, knowledge about the nature and extent of behaviors occurring within and across each identified category of risk behavior is a critical component of efforts to improve and enhance adolescent health.

**Substance Use**

There is a complex social, political, and legal history concerning substance use within United States. Specifically, the use of tobacco, alcohol, and marijuana is of particular concern because of their collective presence as the most commonly used drugs. Despite this complex history, substance use is a well-documented health risk behavior, present across all stages of the lifespan. Not surprisingly, issues related to substance use have had enjoyed prominence since the initiation of the Healthy People initiative. Specifically, substance use has been identified as a contributing factor to the morbidity and mortality associated with unintentional and intentional injuries among adolescents.
As a part of the 1990 Health Objectives for the Nation, reducing alcohol and drug misuse was incorporated as a priority among the lifespan category of adolescents. Interestingly, at that time, while other segments of the population had experienced health gains, similar gains were not occurring among the age group identified as adolescence. Behaviors related to unintentional and intentional injuries were cited among the leading causes of morbidity and mortality within the population. Substance use was indicated as a contributing factor for the presence of these unintentional injury behaviors among adolescents. For this reason, “early”, “ever”, “current”, and “heavy use” patterns of substance use among adolescents were targeted for prevention programming and related surveillance.

A comparable focus on substance use patterns and treatment of substance use has remained as a part of the initiative. In both Healthy People 2000 and Healthy People 2010, substance use was identified as specific topic areas based on the categories of tobacco, and alcohol and other drugs. Objectives related to substance use also were embedded with other related topic areas such as unintentional injuries, mental health and disorders, and violence related behaviors.

Currently, in Healthy People 2020, both tobacco use and substance abuse have been incorporated as unique topic areas within the initiative. Substance use within this topic area includes alcohol, marijuana, and other illicit drugs. As a part of each area, specific objectives and outcomes for adolescent tobacco use and substance abuse have been identified. Among the objectives related to policy and prevention in the area of substance use are “increasing never use”, “increasing disapproval of substance use”, and
“increasing the perception of risk of harm”. Similarly, in the topic area for tobacco use, reducing tobacco use and delaying the initiation of tobacco use have been included as objectives within the topic area. The objectives associated with adolescent tobacco, alcohol and marijuana use found in Healthy People 2020 were consistent with the research questions identified in this study.

Interestingly, several of the objectives identified for the priority areas for tobacco use and substance abuse, have been adopted as Government Performance and Results Act (GPRA) measures for federal funding mechanisms. GPRA measures have been integrated as a part of many federally funded public health initiatives to ensure accountability through the identification of unique performance and evaluation measures. One such example is the Drug Free Communities Support Program (DFC). DFC is designed to support the prevention and reduction of substance use in communities that are awarded DFC funding across the Unites States. Grantees are required to report every two years about alcohol, tobacco, marijuana, and prescription drug use for at least three grade levels, between grades six through twelve. The following measures must be obtained (DHHS, 2013):

- Past 30 day use;
- Perception of risk or harm related to use;
- Perception of parent disapproval of use; and
- Perception of peer disapproval of use.
With a particular focus on substance use, this serves as further evidence of the integration of the Healthy People goals and objectives across federal, state, and local agencies involved in improving the health of the population.

Importantly, a focus on the drugs of tobacco, alcohol, and marijuana within the field of substance use largely is based on the prevalence rates associated with the use of these drugs across many segments of the population. The Gateway Hypothesis provides insight into the potential consequences and progression of use associated with these drugs. The Gateway Hypothesis was developed in the mid 1970’s and described the pattern and progression of drug use, particularly among adolescents (Jenner, 1975). Essentially, the hypothesis suggests that youth who use tobacco and alcohol are more likely to progress to marijuana or other drug use. Part of the controversy associated with the Gateway Hypothesis is the assumption of causation. More specifically, that the use of specific drugs precedes or is the cause for use of illicit drugs (Maldonato-Molin & Lanza, 2000). The co-morbid nature of substance use, the broad social ecological factors that influence use and recent changes in drug use types and patterns serve as further limitations of the theory. Regardless of these criticisms, the reported rates of use associated with tobacco, alcohol, and marijuana, particularly among youth, makes the drugs worthy of further investigation. Research, programs, and policies related to substance use have the potential to positively affect the health of youth and the population at large.
**Surveillance**

One of the most significant challenges documented across the history of the Healthy People initiative has been the role of and gaining access to data to measure associated objectives. Less than 50% of the objectives associated with the 1990 Health Objectives for the Nation were able to be measured based on existing surveillance and data management systems (Green, Wilson & Bauer, 1983). To this end, the development of surveillance systems became a high priority within the early stages of the initiative. As progress in developing these systems has occurred, a focus on ongoing surveillance and monitoring has remained.

The development of surveillance efforts specific to adults preceded those that would support data collection about adolescents. Notably, in the 1980’s, in the Behavioral Risk Factor Surveillance System (BRFSS) was developed to monitor health risk behaviors and related conditions among adults. What was available at that time related to adolescent health, largely was focused on older adolescents. Another concern about the availability of data related to adolescents was the sources of data. Specifically, at the time, information about adolescents provided by their parents or caregivers was considered a primary source of adolescent health data.

Data and surveillance systems specific to adolescents were integral to monitoring the health of the population. The Youth Risk Behavior Surveillance System (YRBSS) was developed in the 1980’s as a national surveillance system designed to provide a risk behavior profile for youth. The YRBS has been used extensively since that time. Researchers have studied and documented evidence of its validity and reliability for use among adolescents. The resulting Youth Risk Behavior Survey (YRBS) assesses risk
behaviors across six categories of risk behavior that have been previously identified as contributing to the leading causes of morbidity and mortality in adulthood. Initially implemented among high school students (grades nine through twelve), administration among middle school, alternative schools, and collegiate aged youth has occurred within the history of the surveillance system.

The YRBS was first administered at the national level in 1981. At the national level, the survey is administered every other year, leading to the development of a health risk behavior profile for adolescents across the country. Led by the CDC, administration of the YRBS has been based largely on collaborative partnerships with state agencies including the Departments of Health and Departments of Education. Overtime, the YRBSS has developed into a robust surveillance system. The methodology associated with survey administration has been adopted by states and local communities. To that end, trainings and technical assistance related to sampling, consent, survey administration, and analysis have become a part of the support provided by the CDC for YRBS implementation at the state and local level.

State and local data are essential to supporting targeted health efforts to improve the health of youth, based on regional trends across identified risk behavior categories. Consistent with this approach, since 2001, the Prevention Research Center for Healthy Neighborhoods (PRCHN) and Case Western Reserve University (CWRU) has supported the implementation of YRBS as part of a regional surveillance system. Data are collected among middle school and high school students in alternating years. The implications of local surveillance, over such an extended period of time have provided a strong
foundation for establishing policy and programming to improve the lives of adolescent. Such data provides critical resources for those who work with adolescents in schools, community, and clinical settings.

**Study**

**Sample**

This study involved secondary analysis of data collected in 2012 Cuyahoga County Middle School Youth Risk Behavior Survey (CCMSYRBS). The CWRU PRCHN administered the CCMSYRBS in the spring of 2012 based on previously discussed guidelines established by the CDC. Upon approval of an application to the Institutional Review Board (IRB) at Kent State University (KSU) and a Data Use Agreement (DUA) to the PRCHN, a database was created and made available for analysis. Approximately, 12,341 cases were included as a part of the dataset. Variables contained with the dataset were specific to demographic characteristics, substance use, and academic achievement. As such, the data were used to explore the relationship between selected substance use, academic achievement selected, and demographics among middle school aged youth.

**Instrumentation**

The CCMSYRBS was a 104 item instrument developed based on the 2011 Standard High School YRBS created by the CDC. The instrument was used for administration among middle school students within the county in the spring of 2012. A unique subset of the overall instrument specifically focusing on selected demographics,
substance use and academic achievement was created and constituted the instrument for this study. A total of 16 items were used to create the dataset of which:

- 9 items were related to demographic characteristics;
- 3 items were related to tobacco use;
- 2 items related to alcohol use; and
- 2 items related to marijuana use.

The demographic characteristics included in the study were: grade level, sex, race, socioeconomic status (SES) and academic achievement. Composite variables for race, SES, and academic achievement were provided as a part of the dataset. Variables for tobacco use included: “ever use of cigarettes” and “current use” of both cigarettes and cigars. Variables for alcohol use included: “ever” and “current use” of alcohol. Variables for marijuana included: “ever” and “current” use of marijuana.

**Research Questions and Analysis of Hypothesis**

Five research questions and thirty-six corresponding hypothesis were tested.

Univariate analysis was conducted to provide a descriptive profile of the sample based on selected demographics, types and patterns of substance use and academic achievement. Bivariate analysis was conducted to assess relationships between variables using the Chi-square test for independence. Associations were considered to be statistically significant at \( p \leq 0.05 \). Variables identified as significant at the bivariate level were included in analysis at the multivariate level. Multivariate analysis included complex samples logistic regression to explore relationships among variables, while controlling for demographic variables. The demographic variables of grade level, sex, race, and SES
(SES) were included in the models. Statistically significant relationships were identified at the p≤.05 at the multivariate level.

Descriptive Statistics

Selected demographic characteristics. The descriptive statistics provided for the sample included the selected demographics of grade level, sex, race, and SES (SES). Among study subjects, there were equal proportions of students both by grade level and by sex. Since the dataset was drawn from a county designated as urban, it was reasonable to presume, that there would be higher rates of racial, ethnic and socioeconomic diversity than would be found in other non-urban countries across the state or nation (USDHUH, 2009). The designation as an “urban county” is based largely upon its proximity to an urban center and the population. The Black and Hispanic populations combined represented more than 47% of the respondents included for study. Approximately 40% of the respondents were White and 13% were categorized as other.

Identifying measures to approximate SES are a recognized challenge among adolescent health researchers. For this study, the World Health Organization’s Family Affluence Scale II (FAS-II) was used to provide a proxy measure for SES (SES). The items on the scale assess the following: family automobile ownership; having their own bedroom; vacation travel; and family computer ownership. The items ask the respondents about common aspects of their lives. There does appear to be some promise in use of the FAS-II scale. Based on findings from the FAS-II, interestingly, the sample was categorized as predominantly high SES. Less than 25% of respondents were categorized as low SES. United States Census Data from the years of 2008-2012 indicated that
17.7% of people within this county were below the poverty level (USDOC, 2013). It is unclear, however, if this SES profile of the sample is consistent with the overall SES profile of youth within the county or just the involved middle school subjects.

**Substance use.** The descriptive statistics for substance use include “ever use” of cigarettes, alcohol and marijuana. Current use included cigarettes, cigars, alcohol, and marijuana. As expected, the majority of youth are not using drugs. This is a key finding that provides support for ongoing prevention, health education, and promotion efforts among youth.

As previously indicated, there are a number of different national instruments that assess substance use among youth, including the Monitoring the Future (MTF) survey and the national YRBS. According to the 2012 MTF study, the reported rates of ever and current use of alcohol, tobacco, and marijuana among 8th graders was (Bryant et. al, 2012):

- 29.5% for ever alcohol use and 11.0% for current alcohol use;
- 15.5% for ever cigarette use and 4.9% for current cigarette use;
- 15.2% for ever marijuana use and 11.4% for current marijuana use.

These reported rates of use confirm alcohol, tobacco, and marijuana as the most prevalent drugs of choice among adolescents.

Among those respondents who reported having used drugs, alcohol was the most common drug reported to be used (compared to cigarettes, cigars, or marijuana). Among respondents who indicated “ever” or “current” use of any one drug, alcohol was again the most common drug used. While the complex history of alcohol has been previously
described, current social norms and accessibility of alcohol within this age group might contribute to the reported rate of use.

Declining rates of tobacco use have been reported within the past 5 years among both youth and adults (CDC, 2013). These declines have been largely attributed to efforts to prevent and control the impact of use within the population. Another interesting finding from this study was related to tobacco use. Specifically, the rate of current cigar use was reported as exceeding that of current cigarette use. The emergence of the use of different types of tobacco products among youth must be explored. It will be difficult to maintain this progress, or generate accurate evidence to support this claim, if the tobacco products most commonly used by youth are not routinely assessed.

The rate of “ever use of cigars” could not be reported because there was not an item on the instrument that assessed this type and pattern of use. The rate of “ever use” of drugs is consistently higher across all other drug categories. It is then reasonable to assume that the rate of “ever cigar use” would be higher than that of “current use”. Inclusion of the related “ever cigar use” item for future use in surveillance efforts is essential to obtaining a complete profile for tobacco use among the population. Inclusion of this item is further supported based on the potential for multi-product and multi-drug use associated with the use of little cigars.

Among the adult population, the reported rate of “little cigar” use within the same county was 7.1%, with users of little cigars being more likely to be multi-product users (Bruckman, Trapl, Jewett-Tennant, and Borowski, 2013; Borowski et. al., 2010). Multi-product users reported used of more than one type of product within a specific drug
category. Trapl et. al, (2012) reported higher rates of marijuana use among little cigar users, consistent with multi-drug use. These finding may explain, the rate of current tobacco and marijuana use reported as a part of this study. In all other drug use categories, “ever” or “current use” of alcohol alone or in combination with another drug is the reported at the highest rate within the category. The only exception to this pattern involves the two-drug combination of current tobacco and marijuana use. This finding might suggest that among adolescents similar multi-product and multi-drug use was occurring.

Among respondents, “ever use of marijuana” was reported at 10.9% and current use at 6.5%. Both of these reported rates were lower than the previously reported rates among 8th grade student from the MTF study. Recent events related to the legalization of marijuana among several states, is a potential concern. This may contribute to more permissive attitudes related to use and risk of harm and ultimately contribute to increases in use among this population.

**Academic achievement.** Academic achievement was used as a dichotomous variable throughout the analysis. This included the categories of high grade and low grades and was consistent with the manner in which the CDC analyzes the variable. High grades were consistent with reported rates of receiving A’s and B. Low grades included C’s, D’s, F’s, other grades and not sure. Dichotomizing academic achievement as high or low is a common treatment of data in adolescent health research. For this study, there were twice as many students reporting high grades than low grades. This was based on the following distribution of grades reported by the samples:
- 34.6% mostly A’s
- 32.3% mostly B’s
- 17.8% mostly C’s
- 4.1% mostly D’s
- 11.4% mostly F’s, other grades, or not sure

**Research Question 1 and Hypotheses 1-4**

There was no statistically significant relationship revealed between academic achievement and grade level among this subject pool. That is to be expected as there is no evidence to support a difference in academic achievement by grade level in the literature. There were, however, statistically significant relationships between academic achievement and sex, race, and SES. More specifically, high academic achievers were more likely than their counterparts to be female, white, and high SES. As such, those who were low academic achievers were more likely to be male, black, and low SES based on their reported rates of low academic achievement and in comparison to their White male counterparts, Hispanic and other non-White males could also be included among this characterization of low academic achievers. This is not surprising, based on the documented achievement gap cited within the educational literature among urban youth (Kunjufu, 2006). The disparity in achievement among minority youth is consistent with that identified by Basch (2011) as an educationally relevant health disparity. Attention to educational outcomes, as a variable of interest within the field of public health and health promotion is growing. This has been demonstrated by the inclusion of
educational achievement as an issue of importance for youth among the objectives associated with adolescent health.

**Research Question 2 and Hypothesis 5-28**

There were statistically significant relationships revealed between “ever use” of cigarettes, alcohol, and marijuana and grade level, race, and SES. Consistent with the literature related to substance the following trends are common (CDC, 2013):

- use increased use as grade level increases;
- higher rates of use among minority groups; and
- higher rates of use and SES decreases.

Among this population, an “ever” cigarette or alcohol user was more likely than their counterparts to be in the 8th grade, Hispanic, and low SES. An ever marijuana user was more likely than their counterparts to be in the 8th grade, male, Black, and reporting to be of low SES. Interestingly, among the subjects in this study, Hispanic youth had the highest rates of “ever use” of cigarettes and alcohol compared with any other racial group.

Perhaps, one of the most interesting findings was the lack of a statistically significant relationship between “ever” cigarette or alcohol use and sex. More specifically, ever cigarette and ever use of alcohol occurred equally among both sexes. The p value for “ever” cigarette use (p=.104) was close to the required significance level of p≤.05. This was an indication that there was minimal overlap within the confidence intervals associated with these two groups. Among “ever” alcohol users, however, the p value (.947) far exceeded the required significance level of p≤.05. Accordingly, in
addition to being the most commonly used drug among the population, there was
evidence to support “ever use” of alcohol equally among both sexes.

Among “current” users there was a statistically significant relationship with the
drug use categories of tobacco, alcohol, and marijuana with the selected demographic
categories of grade level, and race. “Current” marijuana use was the only category of
current drug use that occurred among commonly cited demographic groups. In this
study, current marijuana users were more likely than their counterparts to be in the 8th
grade, male, Hispanic, and of low SES. Among “current” marijuana users, minority
groups reported significantly more use than their White counterparts.

Consistent with previously identified patterns of use, there were typically higher
rates of use reported among respondents as grade level increased. A higher rate of
“current” drug use among minority groups was also consistent with the literature (Bryant,
Schulenberg & O’Malley, 2003). In comparison to different minority youth, black youth
have more consistently reported higher levels of use (CDC, 2013). Within this study,
Hispanic youth reported higher rates of “current” tobacco, alcohol and marijuana use. Of
particular interest related to these findings, were the areas in which statistically
significant relationships were not revealed. While slightly more males reported “current
tobacco use” than females, there was not a statistically significant difference between
sexes. The p value for this result (p=.012) was approaching significance. Among
“current” alcohol users, there was not a statistically significant relationship with either
sex or SES. The p value associated the relationship between “current” alcohol use and
SES, approached significance at p=.075. In this instance the rate of “current” alcohol use
increased as SES decreased. In this study, alcohol use continued to emerge as a consistent risk factor among different segments of respondents.

**Research Question 3 and Hypothesis 29-32**

Among students who were characterized as high academic achievers, the majority reported never using drugs or not currently using drugs. In fact, among those respondents characterized as high academic achievers, they were nearly two times more likely to never have used drugs or not be current drug users, when compared to their low achieving peers. This is an expected finding, as the literature suggested that engagement in drug use is a risk behavior that has the potential to influence both health and education outcomes. Based on these findings, it would be reasonable to assume that youth who abstained from substance use would be expected to perform better academically than their counterparts.

**Research Question 4 and Hypothesis 33-34**

Among student characterized as low academic achievers, they were nearly 2.4 times more likely to have ever used a cigarette and 1.7 times more likely to have ever used alcohol than their counterparts. Similarly among low academic achievers, they were nearly 2.2 times more likely to use cigarettes and 1.8 times more likely to use cigars than their counterparts. Interestingly, both findings revealed the odds associated with tobacco use are higher than that of alcohol or marijuana. This finding further supports the previously identified need to obtain a comprehensive profile of the tobacco use patterns among adolescents. It is possible that the odd ratios associated with “ever” cigar use among low academic achievers could have been statistically significant. These findings
also support the notion the use of any drug is associated with lower academic achievement. This is a key consideration for those who work with youth in school, community, and clinical settings.

In this study, a relatively small proportion of students were identified as multi-drug users. This might account for some of the unexpected findings among this subgroup. Among this population, an additional consideration associated with this finding is the management of missing data. In this instance, cases were included only if they provided data for all of the variables under study. This restricted the number of usable cases, among which there could have been differences in drug use patterns.

**Research Question 5 and Hypothesis 35-36**

Patterns of drug use were explored among both “ever” and “current” users. “Ever” use of any one drug could be reflective of the use of cigarettes, alcohol, or marijuana. A similar orientation was associated with the organization of “current” use, with one exception. A composite variable reflective of ever use of either cigarettes or cigars was created to reflect tobacco use. Among low academic achievers, the odds of being a current 2 drug user were 2.5 times more likely when compared to their high academic achieving peers. The odds associated with current all drug use increased to nearly 3 times more likely when compared to no drug use.

An interesting finding among these results is the odds ratio associated with “ever” using 2 drugs among low academic achievers when compared to their high achieving counterparts. This was not a predictable result as it was expected that the associated odds ratios would increase as the reported number of drugs used increased. There is a
predictable number of drug use combinations associated with “ever” use of 2 drugs. It is possible that the data specific to this limited number of respondents identified as multi-drug users, contributed to this finding. It is possible, too, that the treatment of missing data also contributed to this unpredictable result. That is, the profile of use among this more restricted number of cases used to calculate the ratios might have a different profile of drug use types and patterns of behavior.

Summary

In this study, a robust and diverse dataset was used to analyze the relationships between substance use, selected demographics, and academic achievement among middle school youth. Fortunately, findings revealed that the majority of youth involved in this study reported that they were not using drugs. The reported rates of substance use were consistent or lower than that which had been reported among comparable age groups (CDC, 2013). Alcohol was the most common drug of use among middle school aged youth either alone or in combination with other drugs. The only exception to this finding was based on the current rate of tobacco and marijuana use. These findings suggest the need to address the use, perception of risk or harm, and social norms associated with alcohol use among this population. Importantly, the multi-drug use of tobacco and marijuana has implications for the emergence of new types, patterns, and multi-drug use among adolescents that should be further explored.

Findings revealed statistically significant relationships between “ever” use of cigarettes, alcohol, or marijuana with grade level, race, and SES. There were no statistically significant relationships for “ever” use of cigarettes or alcohol by sex. There
were statistically significant relationships for “current” use of tobacco, alcohol, or marijuana with grade level, race, and SES. The only exception to this finding was for “current” use of alcohol and SES, for which there was not a significant difference in use across SES. There was not a statistically significant relationship between alcohol or tobacco use with sex. These findings suggest that alcohol use occurred across the SES spectrum and is consistent with its identification as the most common drug used among respondents.

There were statistically significant relationships between academic achievement and sex, race, and SES. High academic achievers were more likely to be female, white, and of high SES. In addition, high academic achievers were more likely to be non-drug users. When comparing students of varying academic achievement, those students reporting low academic achievement were more likely to have “ever” used drugs, “currently” used drugs, “ever” used more than one drug, and “currently” used more than one drug. These findings suggested that “ever use”, of any drug, was a risk factor for low academic achievement in middle school subjects. As a consequence, it appears that delaying the onset of this behavior is essential to the academic performance and health among students at the middle school level.
Recommendations for Further Research

Findings from this study suggest potential for further research. Three such potential areas of research have been identified:

- **Multi-product and multi-drug use associated with tobacco use among youth.**
  As previously indicated, there has been recent success in reducing tobacco rates among adults and youth. This has been based largely on the reported declining rates of cigarette use among the population. The current study identified an additional tobacco product, little cigars, which might have been more commonly used among specific segments of the population. It is possible that trends related to little cigar use among adults may mirror that of adults. The use of little cigars among this population has also been associated with marijuana use. For these reasons, further research into multi-product and multi-drug use among urban youth warrants further exploration.

- **Attitudes and perceptions related to youth alcohol use.**
  Alcohol was the most commonly used drug among youth within this research study. In the US it is currently illegal for youth to purchase alcohol under the age of 21. At the state level, however, there is variability in the laws related to consumption of alcohol. Ohio is a social host state, which limits parent’s ability to provide alcohol to any minor other than their own child. The complex role of alcohol within society, particularly norms related to use, may impact adolescent attitudes and behaviors related to use. Research related to social norms, perception of risk or harm, and parental permissiveness would
provide a greater understanding about factors that contribute to youth substance youth.

- *Examining substance use based on geographic differences.*

It is possible that there might be differences in the reported rates of health risk behaviors based on the geographic location of youth. Of specific interest would be further research that allowed for the comparison of urban, inner ring and outer ring youth. Inner ring youth reside in communities that share a border with the urban center of the county. Outer ring communities are the remaining cities within the county that are not the urban center and are not inner ring communities.

- *Other health risk behaviors and academic achievement.*

Evidence suggested other health risk behaviors might contribute to academic outcomes. (Basch, 2011). Since the YRBS includes items related to other risk behavior categories, it would be advisable to explore other patterns of risk behaviors and determine their impact on academic achievement.

**Recommendations for Health Education and Health Promotion**

Findings from this study have important implications for field of health education and health promotion.

- *Advocate for health education and universal prevention specific to substance use prevention and positive youth development.*

The competencies associated with the profession of health education and health promotion have included the role of advocacy (NCHEC, 2008).
Advances in substance use prevention occurred largely based on programming in response to the “war of drugs” in the 1980’s. Since that time, the development and identification of related evidence-based programs has grown. There is not, however, comprehensive adoption of these programs within the educational setting. Universal prevention methods are an effective method to reduce and prevent the measurable use of substances among youth. Advocating for the inclusion of evidence-based practices, in all phases of health education for school-aged youth is an essential.

- **Collaborate among school and community health professionals to improve both educational and health outcomes among youth.**

While there is a historic relationship between the systems of education and health, there is variability in the nature and scope of collaboration. Collaborative approaches to research and service are increasingly integrated, recognized, and accepted, within the profession (Minkler & Wallerstein, 2008). Development of participatory approaches that allow for mutually beneficial outcomes has the ability to remove the silos in which the work occurs. These efforts are consistent with those required of the competencies within the field, particularly those related to: research and evaluation; and assessment and program design.

- **Conduct research for the educationally relevant health disparities.**

The work of Basch (2011) has laid the foundation for the identification of educationally relevant health disparities. The concept of health disparities is
not new, and has been the basis for much of the national *Healthy People* agenda. This topic, however, has not been a part of the national education agenda. To the end, it is essential to grow the body of knowledge related to the relationship between health and learning, specifically related to educationally relevant health disparities.

**Limitations**

The following limitations were associated with this study:

- *Use of self-reported data.*

  Use of self-reported data is common in the social and behavioral sciences. In this particular study the YRBS was used to assess substance use, selected demographics, and academic achievement. The YRBS has an extensive history of use among the adolescent population. Multiple studies have been published establishing the validity and reliability of the instrument. These studies have resulted in changes to the instrument, over time, which have minimized issues of cognition and recall that were concerns in previous survey administrations.

- *Use of cross sectional data.*

  Cross sectional data represents a profile of the population at a single point in time. From this data prevalence rates and associations can be explored. Common limitations of cross sectional data include selection bias and an inability to explore causation (Delgado-Rodriguez, M & Llorca, J., 2004). In this instance, the sampling followed the CDC guidelines for a two-stage
sampling design. Use of this sampling framework and having yielded the appropriate response rate allows the data to be generalized to the population. For the purposes of this study, the focus on prevalence rates and associations was appropriate.

- **Management of missing data.**

  While 12,341 cases were provided for analysis, not every case contained completed data for all of the variables under study. Analysis was conducted in a manner that allowed for the inclusion of all possible cases. Only cases for which completed data for the variables under study were included for analysis. For this reason, as the number of variables included in the analysis increased, there was an overall decrease in the number of cases included for analysis. Missing data is not an uncommon finding within social and behavioral sciences. It is, however, important to make an active decision about the management of missing data in order to ensure consistency in analysis.
APPENDICES
APPENDIX A

INSTRUMENT – CUYAHOGA COUNTY MIDDLE SCHOOL
YOUTH RISK BEHAVIOR SURVEY
APPENDIX A

INSTRUMENT – CUYAHOGA COUNTY MIDDLE SCHOOL YOUTH RISK BEHAVIOR SURVEY

2012

Middle School Youth Risk Behavior Survey

Directions
This survey is about health behavior. It has been developed so you can tell us what you do that may affect your health. The information you give will be used to develop better health education for young people like yourself.

DO NOT write your name on this survey. The answers you give will be kept private. No one will know what you write. Answer the questions based on what you really do.

Completing this survey is voluntary. Whether or not you answer the questions will not affect your grade in this class. If you are not comfortable answering a question, just leave it blank.

The questions that ask about your background will be used only to describe the types of students completing the survey. This information will not be used to find out your name. No names will ever be reported. Make sure to read every question. Fill in the circles completely. When you are finished, place your completed survey in the envelope provided.

Thanks for your help

[Logos of various organizations]
### DEMOGRAPHICS TOTAL 114 Items!

1. What is your Zip Code? (Use only your zip code in the shaded blank boxes. Fill in the matching oval below each number.)

<table>
<thead>
<tr>
<th>ZipCode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>3</td>
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<tr>
<td>14</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>16</td>
</tr>
</tbody>
</table>

Example

2. How old are you? (Age)

<table>
<thead>
<tr>
<th>1</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>10 yrs old or younger</td>
</tr>
<tr>
<td>11</td>
<td>11 yrs old</td>
</tr>
<tr>
<td>12</td>
<td>12 yrs old</td>
</tr>
<tr>
<td>13</td>
<td>13 yrs old</td>
</tr>
<tr>
<td>14</td>
<td>14 yrs old</td>
</tr>
<tr>
<td>15</td>
<td>15 yrs old</td>
</tr>
<tr>
<td>16</td>
<td>16 yrs old or older</td>
</tr>
</tbody>
</table>

3. What grade are you in?

<table>
<thead>
<tr>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>6th</td>
</tr>
<tr>
<td>7th</td>
</tr>
<tr>
<td>8th</td>
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<tr>
<td>9th</td>
</tr>
<tr>
<td>10th</td>
</tr>
<tr>
<td>11th</td>
</tr>
<tr>
<td>12th</td>
</tr>
</tbody>
</table>

4. What is your sex?

<table>
<thead>
<tr>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>

5. Are you Hispanic or Latino?

<table>
<thead>
<tr>
<th>Hispanic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

6. What is your race? (Select one or more responses.)

<table>
<thead>
<tr>
<th>Race</th>
</tr>
</thead>
<tbody>
<tr>
<td>White (racewht)</td>
</tr>
<tr>
<td>Black (raceblk)</td>
</tr>
<tr>
<td>Asian (raceasian)</td>
</tr>
<tr>
<td>Hawaiian (racehawa)</td>
</tr>
</tbody>
</table>

7. During the past 12 months, how would you describe your grades in school? (Select one or more responses.)

<table>
<thead>
<tr>
<th>Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mostly A's</td>
</tr>
<tr>
<td>Mostly B's</td>
</tr>
<tr>
<td>Mostly C's</td>
</tr>
<tr>
<td>Mostly D's</td>
</tr>
<tr>
<td>Mostly F's</td>
</tr>
<tr>
<td>None of these grades</td>
</tr>
<tr>
<td>Not sure</td>
</tr>
</tbody>
</table>

8. Which of the following people live in the same house as you? (Select one or more responses.)

<table>
<thead>
<tr>
<th>Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother</td>
</tr>
<tr>
<td>Father</td>
</tr>
<tr>
<td>Stepfather</td>
</tr>
<tr>
<td>Grandparent(s)</td>
</tr>
<tr>
<td>Aunt(s)/Uncle(s)</td>
</tr>
<tr>
<td>Brother(s)/Sister(s)</td>
</tr>
<tr>
<td>My children</td>
</tr>
<tr>
<td>Non-relative or other</td>
</tr>
</tbody>
</table>

9. Does your family own a car, van or truck?

<table>
<thead>
<tr>
<th>Own</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

10. Do you have your own bedroom for yourself?

<table>
<thead>
<tr>
<th>Own</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

11. During the past 12 months, how many times did you travel away on vacation with your family?

<table>
<thead>
<tr>
<th>Vacation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once</td>
</tr>
<tr>
<td>Twice</td>
</tr>
<tr>
<td>More than twice</td>
</tr>
</tbody>
</table>

12. How many computers does your family own?

<table>
<thead>
<tr>
<th>Computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
<tr>
<td>One</td>
</tr>
<tr>
<td>Two</td>
</tr>
<tr>
<td>More than two</td>
</tr>
</tbody>
</table>
13. How many days of the week do you take care of yourself in the afternoon or evening after school without an adult being there?
   a. No days 
   b. 1 day 
   c. 2 days 
   d. 3 days 
   e. 4 days 
   f. All five days 

14. Think of those days during the week that you take care of yourself in the afternoon or evening after school without an adult being there. How many hours do you usually take care of yourself? Read: 
   a. I am not left alone 
   b. 1 hour 
   c. 2 hours 
   d. 3 hours 
   e. 4 or more hours 

The next 4 questions ask you about your HEIGHT AND WEIGHT.

15. How tall are you without your shoes on?
   Directions: Write your height in the shaded blank boxes. Fill in the matching oval below each number.

<table>
<thead>
<tr>
<th>Height</th>
<th>Feet</th>
<th>Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1.1</td>
<td></td>
</tr>
</tbody>
</table>

Example: 5 feet 1.1 inches

16. How much do you weigh without your shoes on?
   Directions: Write your weight in the shaded blank boxes. Fill in the matching oval below each number.

<table>
<thead>
<tr>
<th>Weight</th>
<th>Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S : 2</td>
</tr>
</tbody>
</table>

Example: 1 S 2 pounds

17. How do you describe your weight?
   a. Very underweight
   b. Slightly underweight
   c. About the right weight
   d. Slightly overweight
   e. Very overweight

18. Which of the following are you trying to do about your weight? Read about
   a. Lose weight
   b. Gain weight
   c. Stay the same weight
   d. I am not trying to do anything about my weight

The next 2 questions ask you about SAFETY.

19. When you ride a bicycle, how often do you ear a helmet?
   a. I do not ride a bicycle
   b. Never wear a helmet
   c. Rarely wear a helmet
   d. Sometimes wear a helmet
   e. Most of the time wear a helmet
   f. Always wear a helmet
20. How often do you wear a seatbelt when riding
   a. Never
   b. Sometimes
   c. Most of the time
   d. Always

The next 6 questions ask you about your DIET.
21. Yesterday, how many times did you eat fruit? (Foods like apple, papaya, banana, orange, applesauce or pear. Do not count fruit juices)
   a. 0 times
   b. 1 time
   c. 2 times
   d. 3 or more times

22. Yesterday, how many times did you eat vegetables? (Foods like broccoli, spinach, arrots, squash, tomatoes or green beans.)
   a. 0 times
   b. 1 time
   c. 2 times
   d. 3 or more times

23. Yesterday, how many times did you eat green salad? (Salads that contain lettuce, spinach, or their greens.)
   a. 0 times
   b. 1 time
   c. 2 times
   d. 3 or more times

24. Yesterday, how many times did you drink milk? (Include milk you drank in a glass or cup, from a carton, or with cereal. A milk shake
   a. 0 times
   b. 1 time
   c. 2 times
   d. 3 or more times

25. During the past 7 days, on how many mornings did you eat breakfast?
   a. I did not eat breakfast in the past 7 days
   b. 1 or 2 mornings
   c. 3 or 4 mornings
   d. 5 or 6 mornings
   e. Every morning

26. During the past 7 days, on how many days did you eat fast food? (like McDonalds, Burger King, Pizza Hut, Taco Bell, Kentucky Fried Chicken, or Subway)
   a. 0 days
   b. 1 day
   c. 2 days
   d. 3 days
   e. 4 days
   f. 5 days
   g. 6 days
   h. Everyday

The next 3 questions ask you about PHYSICAL ACTIVITY.
27. On an average school day, how many hours do you watch TV?
   a. Less than 1 hour per day
   b. 1 hour per day
   c. 2 hours per day
   d. 3 hours per day
   e. 4 hours per day
   f. 5 or more hours per day

28. On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work? (Include activities such as Nintendo, Game Boy, PlayStation, Xbox, computer games, and the Internet.)
   a. Less than 1 hour per day
   b. 1 hour per day
   c. 2 hours per day
   d. 3 hours per day
   e. 4 or more hours per day
29. During the past 7 days on how many days were you physically active for a total of at least 60 minutes per day? (Add up all the time you spend in any kind of physical activity that increases your heart rate and makes you breathe hard some of the time.) 1Pa_60

1. 0 days
2. 1 day
3. 2 days
4. 3 days
5. 4 days
6. 5 days
7. 6 days
8. 7 days
9. 8 or more days

The next 5 questions ask you about TOBACCO USE.

30. Have you ever tried cigarette smoking, even one or two puffs? 1smk ever

1. Yes
2. No

31. How old were you when you smoked a whole cigarette for the first time? 1smk age

1. I have never smoked a whole cigarette
2. 8 years old or younger
3. 9 years old
4. 10 years old
5. 11 years old
6. 12 years old
7. 13 years old or older

32. During the past 30 days, on how many days did you smoke cigarettes? 1smk 30

1. 0 days
2. 1 or 2 days
3. 3 to 5 days
4. 6 to 9 days
5. 10 to 19 days
6. 20 to 29 days
7. A/130 days
8. A/310 days
9. A/60 days

33. During the past 30 days, on how many days did you smoke cigarettes on school property?

1. 0 days
2. 1 or 2 days
3. 3 to 5 days
4. 6 to 9 days
5. 10 to 19 days
6. 20 to 29 days
7. A/130 days
8. A/310 days
9. A/60 days

34. During the past 30 days, on how many days did you smoke cigars, cigarillos, or little cigars, such as Black and Molds, Swisher Sweets, or Phillies?

1. 0 days
2. 1 or 2 days
3. 3 to 5 days
4. 6 to 9 days
5. 10 to 19 days
6. 20 to 29 days
7. A/130 days
8. A/310 days
9. A/60 days

The next 4 questions ask you about drinking.

35. Have you ever had a drink of alcohol or other than a few sips? 1alch ev

1. Yes
2. No
3. If, by

36. How old were you when you had your first drink of alcohol other than a few sips? 1alch age

1. I have never had a drink of alcohol other than a few sips
2. 8 years old or younger
3. 9 years old
4. 10 years old
5. 11 years old
6. 12 years old
7. 13 years old or older
37. During the past 30 days, on how many days did you have at least one drink of alcohol?

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<table>
<thead>
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<tbody>
<tr>
<td>1</td>
<td>O. 0 days</td>
</tr>
<tr>
<td>2</td>
<td>b. 1 or 2 days</td>
</tr>
<tr>
<td>3</td>
<td>c. 3 to 5 days</td>
</tr>
<tr>
<td>4</td>
<td>d. 6 to 9 days</td>
</tr>
<tr>
<td>5</td>
<td>e. 10 to 19 days</td>
</tr>
<tr>
<td>6</td>
<td>f. 20 to 29 days</td>
</tr>
<tr>
<td>7</td>
<td>g. All 30 days</td>
</tr>
</tbody>
</table>

38. During the past 30 days, on how many days did you have at least one drink of alcohol on school property? 

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<tbody>
<tr>
<td>1</td>
<td>O. 0 days</td>
</tr>
<tr>
<td>2</td>
<td>b. 1 or 2 days</td>
</tr>
<tr>
<td>3</td>
<td>c. 3 to 5 days</td>
</tr>
<tr>
<td>4</td>
<td>d. 6 to 9 days</td>
</tr>
<tr>
<td>5</td>
<td>e. 10 to 19 days</td>
</tr>
<tr>
<td>6</td>
<td>f. 20 to 29 days</td>
</tr>
<tr>
<td>7</td>
<td>g. All 30 days</td>
</tr>
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</table>

The next 4 questions ask you about MARIJUANA USE. Marijuana also is called grass or pot.

39. Have you ever used marijuana?

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<th></th>
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<tbody>
<tr>
<td>a</td>
<td>Yes</td>
</tr>
<tr>
<td>b</td>
<td>No</td>
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</table>

40. How old were you when you tried marijuana for the first time? Imari age

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<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>I have never tried marijuana</td>
</tr>
<tr>
<td>b</td>
<td>8 years old or younger</td>
</tr>
<tr>
<td>c</td>
<td>9 years old</td>
</tr>
<tr>
<td>d</td>
<td>10 years old</td>
</tr>
<tr>
<td>e</td>
<td>11 years old</td>
</tr>
<tr>
<td>f</td>
<td>12 years old</td>
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<tr>
<td>g</td>
<td>13 years old or older</td>
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41. During the past 30 days, how many times did you

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<tbody>
<tr>
<td>e</td>
<td>20 to 39 times</td>
</tr>
<tr>
<td>f</td>
<td>40 or more times</td>
</tr>
</tbody>
</table>

42. During the past 30 days, on how many days did you smoke marijuana on school property?

<p>| | |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>e. 0 days</td>
</tr>
<tr>
<td>2</td>
<td>b. 1 or 2 days</td>
</tr>
<tr>
<td>3</td>
<td>c. 3 to 5 days</td>
</tr>
<tr>
<td>4</td>
<td>d. 6 to 9 days</td>
</tr>
<tr>
<td>5</td>
<td>e. 10 to 19 days</td>
</tr>
<tr>
<td>6</td>
<td>f. 20 to 29 days</td>
</tr>
<tr>
<td>7</td>
<td>g. All 30 days</td>
</tr>
</tbody>
</table>

The next 4 questions ask you about other drugs.

43. Have you ever sniffed glue, or breathed the contents of spray cans, or inhaled any paints or sprays to get high? Imari life

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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Yes</td>
</tr>
<tr>
<td>b</td>
<td>No</td>
</tr>
</tbody>
</table>

44. During your lifetime, how many times have you used prescription pain relievers or painkillers without a doctor’s prescription, such as Vicodin, Percocet, OxyContin, Lortab, or Codeine (also called Oxy, OxyContin, Os, Norcoj)? Imari life

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>b</td>
<td>1 or 2 times</td>
</tr>
<tr>
<td>c</td>
<td>3 or more times</td>
</tr>
<tr>
<td>d</td>
<td>10 to 19 times</td>
</tr>
<tr>
<td>e</td>
<td>20 to 39 times</td>
</tr>
<tr>
<td>f</td>
<td>40 times or more</td>
</tr>
</tbody>
</table>

45. During your lifetime, what type of prescription drugs have you taken without a doctor’s prescription? (Select one or more responses.)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>I do not take prescription drugs without a doctor’s prescription</td>
</tr>
<tr>
<td>b</td>
<td>Narcotic pain relievers such as OxyContin, Percocet, Vicodin, or Lortab</td>
</tr>
<tr>
<td>c</td>
<td>Tranquilizers or anti-anxiety drugs such as Xanax, or Valium</td>
</tr>
<tr>
<td>d</td>
<td>Sedating pills, sedatives, and other depressants such as Ambien, or Phenobarbital</td>
</tr>
<tr>
<td>e</td>
<td>Stimulants or amphetamines such as Ritalin (also called Vitamins or Study Drug)</td>
</tr>
<tr>
<td>f</td>
<td>I take multiple prescription drugs at the same time</td>
</tr>
<tr>
<td>g</td>
<td>Not sure</td>
</tr>
</tbody>
</table>
46. During the past 12 months, has anyone offered, sold, or given you any illegal drugs on school property? Yes No

The next 7 questions ask you about VIOLENCE-RELATED BEHAVIORS.

47. During the past 30 days, on how many days did you not go to school because you felt you would be unsafe at school or on your way to school? 1 day 2 or 3 days 4 or 5 days 6 or more days

48. During the past 12 months, how many times were you in a physical fight? 0 times 1 time 2 or 3 times 4 or 5 times 6 or 7 times 8 or 9 times 10 or 11 times 12 or more times

49. During the past 12 months, how many times were you in a physical fight on school property? 0 times 1 time 2 or 3 times 4 or 5 times 6 or more times

50. During the past 30 days, on how many days did you carry a weapon, such as a gun, knife, or club on school property? 0 days 1 day 2 or 3 days 4 or 5 days 6 or more days

51. During the past 30 days, have you been harassed or picked on at school by another student? Yes No

52. During the past 12 months, have you ever been the victim of electronic gossip or bullying, such as through e-mail, chat rooms, instant messaging, Web sites, or text messaging? Yes No

53. During the past 12 months, how many times did you do something to purposely hurt yourself, without wanting to die, such as cutting or burning yourself on purpose? 0 times 1 time 2 or 3 times 4 or 5 times 6 or more times

The next 3 questions ask you about the future that they may consider, attempting suicide or killing themselves.

54. During the past 12 months, did you ever feel so sad and hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities? Yes No

55. During the past 12 months, did you ever seriously consider attempting suicide? Yes No

56. During the past 12 months, how many times did you or someone else attempt suicide? 1 time 2 or 3 times 4 or 5 times 6 or more times
The two questions ask you about sexual intercourse.

57. Have you ever had sexual intercourse?
   a. Yes
   b. No

58. The last time you had sexual intercourse did you or your partner use a condom?
   a. I have never had sexual intercourse
   b. Yes
   c. No

The next 3 questions ask you about other health-related topics.

59. When was the last time you saw a doctor or nurse for a checkup or physical exam when you were not sick or injured?
   a. During the past 12 months
   b. Between 12 and 24 months ago
   c. More than 24 months ago
   d. Never
   e. Not sure

60. Have you ever been taught about AIDS or HIV in school?
   a. Yes
   b. No
   c. Not sure

61. How would you describe your health in general?
   a. Excellent
   b. Very good
   c. Good
   d. Fair
   e. Poor

The next 6 questions ask about your activities and your experiences at school and at home.

62. During the past 12 months, how many sports teams did you play? (Include any teams run by your school or community
   a. 1 team
   b. 2 teams
   c. 3 or more teams

63. During the past 7 days, on how many days did you take part in organized after-school, evening, or weekend activities other than
   sports teams such as school clubs, community center groups, music/art/dance lessons, drama, or other supervised activities?
   a. 0 days
   b. 1 to 2 days
   c. 3 to 4 days
   d. 5 days
   e. 6 days
   f. 7 days

64. During the past 7 days, how many hours did you spend helping other people without getting paid (such as helping out at a hospital,
   daycare center, food shelf, or other things to make your community a better place for people to live? (Include)
   a. 0 hours
   b. 1 hour
   c. 2 hours
   d. 3 hours
   e. 4 hours
   f. 5 hours
   g. 6 hours
   h. 7 hours

65. How often does one of your parents talk with you about what you are doing in school?
   a. About every day
   b. About once or twice a week
   c. About once or twice a month
   d. Less than once a month
   e. Never

66. How much do you agree with the following statement? Students help decide what goes on in my school?
   a. Strongly agree
   b. Agree
   c. Not sure
   d. Disagree
   e. Strongly disagree
67. How much do you agree with the following statement? In my community, I feel like I matter to people. Matter
   a. Strongly agree
   b. Agree
   c. Not sure
   d. Disagree
   e. Strongly disagree

The next 3 items ask about family interactions and social support.

68. During the past 7 days, on how many days did you eat dinner with your family?
   a. 0 days
   b. 1 day
   c. 2 days
   d. 3 days
   e. 4 days
   f. 5 days
   g. 6 days
   h. 7 days

69. How many adults would you feel comfortable seeking help from if you had an important issue or question affecting your life?
   a. 0 adults
   b. 1 adult
   c. 2 adults
   d. 3 adults
   e. 4 adults
   f. 5 or more adults

70. How many of your friends would you trust to offer you good advice if you had a really important secret or problem affecting your life?
   a. 0 friends
   b. 1 friend
   c. 2 friends
   d. 3 friends
   e. 4 friends
   f. 5 or more friends

The next 2 questions ask about social networking.

71. On an average school day, how much time do you spend on social networking sites such as MySpace or FaceBook? 1 hour
   a. I do not spend any time on social networking sites
   b. Less than 1 hour per day
   c. 1 hour per day
   d. 2 hours per day
   e. 3 hours per day
   f. 4 hours per day
   g. 5 or more hours per day

72. On an average school day, how often do you text (send and receive) your friends? 1 time
   a. 0 times
   b. 1 or 2 times
   c. 3 to 10 times
   d. 11 to 30 times
   e. 31 to 60 times
   f. 61 to 120 times
   g. 120 or more times

The next 10 items ask about the rules your parents or guardians have, the things that you are allowed to do, and the relationship you have with them.

73. My parents know where I am after school.
   a. Never
   b. Rarely
   c. Sometimes
   d. Usually
   e. Always

74. If I am going to be home late, I am expected to call my parents. 1 call
   a. Never
   b. Rarely
   c. Sometimes
   d. Usually
   e. Always
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
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<tbody>
<tr>
<td>75. Talk with my parent(s) about the plans I have with my friends.</td>
<td>a. Never</td>
</tr>
<tr>
<td></td>
<td>b. Rarely</td>
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<td></td>
<td>c. Sometimes</td>
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<td></td>
<td>d. Usually</td>
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<td></td>
<td>e. Always</td>
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<tr>
<td>76. When I go out my parents ask me where I am going.</td>
<td>a. Never</td>
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<td></td>
<td>b. Rarely</td>
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<td></td>
<td>c. Sometimes</td>
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<td></td>
<td>d. Usually</td>
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<td></td>
<td>e. Always</td>
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<tr>
<td>77. Tell my parents the truth about where I am, where I am going, and</td>
<td>a. Never</td>
</tr>
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<td>who I am going.</td>
<td>b. Rarely</td>
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<td></td>
<td>c. Sometimes</td>
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<td></td>
<td>d. Usually</td>
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<td></td>
<td>e. Always</td>
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<tr>
<td>78. I am allowed to have a friend over when my parents are not home</td>
<td>a. Never</td>
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<tr>
<td>as long as I tell my parents beforehand.</td>
<td>b. Rarely</td>
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<td></td>
<td>c. Sometimes</td>
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<td></td>
<td>d. Usually</td>
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<td></td>
<td>e. Always</td>
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<tr>
<td>79. I am allowed to go to a friend's house even when my parents are</td>
<td>a. Never</td>
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<tr>
<td>at home as long as I tell my parents beforehand.</td>
<td>b. Rarely</td>
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<td></td>
<td>c. Sometimes</td>
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<td></td>
<td>d. Usually</td>
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<td></td>
<td>e. Always</td>
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<tr>
<td>80. While out with friends I am allowed to change plans.</td>
<td>a. Never</td>
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<td></td>
<td>b. Rarely</td>
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<td></td>
<td>c. Sometimes</td>
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<td></td>
<td>d. Usually</td>
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<td></td>
<td>e. Always</td>
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<td>81. My parents trust me to make good decisions.</td>
<td>a. Strongly agree</td>
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<td></td>
<td>b. Agree</td>
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<td></td>
<td>c. In the middle</td>
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<td></td>
<td>d. Disagree</td>
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<td></td>
<td>e. Strongly disagree</td>
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<tr>
<td>82. My parents pretty much let me do whatever I want.</td>
<td>a. Strongly agree</td>
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<td></td>
<td>b. Agree</td>
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<td></td>
<td>c. In the middle</td>
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<td></td>
<td>d. Disagree</td>
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<td></td>
<td>e. Strongly disagree</td>
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<tr>
<td>83. How wrong do you think it is for someone your age to drink beer,</td>
<td>a. Very wrong</td>
</tr>
<tr>
<td>wine, or hard liquor (for example, vodka, whiskey, or gin) regularly?</td>
<td>b. Wrong</td>
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<tr>
<td></td>
<td>c. A little wrong</td>
</tr>
<tr>
<td></td>
<td>d. Not at all wrong</td>
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<tr>
<td>84. How wrong do you think it is for someone your age to smoke</td>
<td>a. Very wrong</td>
</tr>
<tr>
<td>cigarettes? (cig)</td>
<td>b. Wrong</td>
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<tr>
<td></td>
<td>c. A little wrong</td>
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<tr>
<td></td>
<td>d. Not at all wrong</td>
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<tr>
<td>85. How wrong do you think it is for someone your age to smoke</td>
<td>a. Very wrong</td>
</tr>
<tr>
<td>marijuana (marijuana)</td>
<td>b. Wrong</td>
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<td></td>
<td>c. A little wrong</td>
</tr>
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<td></td>
<td>d. Not at all wrong</td>
</tr>
<tr>
<td>86. How wrong do your parents feel it would be for you to drink beer,</td>
<td>a. Very wrong</td>
</tr>
<tr>
<td>wine, or hard liquor (for example, vodka, whiskey, or gin) regularly?</td>
<td>b. Wrong</td>
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<tr>
<td></td>
<td>c. A little wrong</td>
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<td></td>
<td>d. Not at all wrong</td>
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</table>
87. How wrong do your parents feel it would be for you to smoke cigarettes? *jwp jcig*
   a. Very wrong
   b. Wrong
   c. A little wrong
   d. Not at all wrong

88. How wrong do your parents feel it would be for you to smoke marijuana? *jwp mar*
   a. Very wrong
   b. Wrong
   c. A little wrong
   d. Not at all wrong

The next 4 questions ask about how much young people risk harming oneself if they do certain behaviors.

89. How much do you think young people risk harming themselves (physically or in other ways) if they smoke one or more packs of cigarettes a day? *iskpack*
   a. Great risk
   b. Moderate risk
   c. Little risk
   d. No risk

90. How much do you think young people risk harming themselves (physically or in other ways) if they take one or two drinks of an alcoholic beverage (beer, wine, liquor) nearly every day? *iskreg*
   a. Great risk
   b. Moderate risk
   c. Little risk
   d. No risk

91. How much do you think young people risk harming themselves (physically or in other ways) if they try marijuana once or twice? *insk1or2*
   a. Great risk
   b. Moderate risk
   c. Little risk
   d. No risk

92. How much do you think young people risk harming themselves (physically or in other ways) if they smoke marijuana regularly? *inskreg*
   a. No risk
   b. Little risk
   c. Moderate risk
   d. Great risk

The next 12 questions ask about food availability and snacking habits.

93. Are students allowed to have food in the classroom? *jsrp lc*
   a. Always
   b. Sometimes
   c. Never

94. Are students allowed to have beverages in the classroom? *jsrp bw*
   a. Always
   b. Sometimes
   c. Never

95. Are students allowed to have snacks in the hallways? *iswth*
   a. Always
   b. Sometimes
   c. Never

96. Are students allowed to have beverages in the hallways? *iswtp bh*
   a. Always
   b. Sometimes
   c. Never

97. Are food or food coupons used as a reward or incentive for students? *iswp fr*
   a. Always
   b. Sometimes
   c. Never

98. Do you have classroom fundraising that includes food sales? *iswp fund*
   a. Always
   b. Sometimes
   c. Never
99. Do you have school-wide fundraising that includes food sales?  
   a. Always  jswp_swfund  
   b. Sometimes  
   c. Never  

100. At school are there vending machines with chips, candy, cookies, or pop/soda that students can use? »vend  
    a. Yes  
    b. No  

101. In an average school week, how often do you eat snacks during the school day? (Do Not include the snacks you eat during lunch)  
    a. Never  nsnackS  
    b. 1-2 days a week  
    c. 3-4 days a week  
    d. Everyday  

102. When you snack at school (not including lunch), what types of snacks do you usually eat? (Choose all that apply) jsnackC  
    a. I do not eat snacks during the school day  
    b. Chips  
    c. Candy  
    d. Regular pop/soda  
    e. Diet pop/soda  
    f. Other sugary drinks (Gatorade, Iced Tea, Fruit Punch, etc.)  
    g. Water  
    h. Gum  
    i. Fruit or a healthy option  
    j. Something else  

103. In an average school week, how often do you stop at a corner store, convenience store, drug store, grocery store, or other store that sells food on your way to or from school? (Do not include the snacks you eat during lunch) jscomerA  
    a. Yes a week  
    b. 1-2 days a week  
    c. 3-4 days a week  
    d. Everyday  
    e. I do not stop at a store on my way to or from school  
    f. Chips jscomerB  
    g. Candy  
    h. Regular pop/soda  
    i. Diet pop/soda  
    j. Other sugary drinks (Gatorade, Iced Tea, Fruit Punch, etc.)  
    k. Water  
    l. Gum  
    m. Fruit or a healthy option  
    n. Something else
APPENDIX B

KSU IRB APPLICATION
**APPENDIX B**

**KSU IRB APPLICATION**

<table>
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<tr>
<th>IRB LOG NUMBER</th>
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**KENT STATE**

**EXEMPT FROM ANNUAL REVIEW APPLICATION (Level I)**

<table>
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<tr>
<th>THIS SECTION FOR USE BY IRB</th>
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<tbody>
<tr>
<td>REVIEWER INFORMATION</td>
<td></td>
</tr>
<tr>
<td>Discipline Specific Reviewer</td>
<td></td>
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<tr>
<td>Comments</td>
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</table>

**INSTRUCTIONS for INVESTIGATORS:**

1. Complete this form to request an exemption determination for your study.
2. When the Categories of Research Activity that are Exempt from Review are completed, the IRB office will notify the investigator of the exemption determination. If your study does not meet the exemption criteria, you will be asked to complete the USE OF HUMAN SUBJECTS IN RESEARCH application.
3. Submit this completed form any needed Appendices via email attachment to the IRB director or seek the reviewer. To submit the form via a typed signature, the form submitted from the investigator's @kent.edu email account. If completed form is signed and then scanned as a PDF attachment, the @kent.edu email requirement does not apply.
4. Do NOT begin data collection prior to receiving notification from the KSU IRB that the study meets the exemption criteria.

**DEFINITIONS**

**Minimal risk:**
The probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.

**Prisoner:**
An individual involuntarily confined or detained in a penal institution (e.g., prison, jail, or juvenile offender facility), with restricted ability to leave the institution. The term is intended to encompass individuals sentenced to such an institution under a criminal or civil statute, individuals detained in other facilities by virtue of statutes or commitment procedures that provide alternatives to criminal prosecution or incarceration in a penal institution, and individuals detained pending arraignment, trial, or sentencing.

**Title of Study:** Substance use, perception of harm, and the relationship to academic achievement among middle school aged youth

**Last Name:** Ding  
**First Name:** Kele

<table>
<thead>
<tr>
<th>Email</th>
<th><a href="mailto:kkilling@kent.edu">kkilling@kent.edu</a></th>
<th>Phone: (330) 672 - 0688 or extension</th>
<th>Department: HEALTH EDUCATION &amp; PROMOTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status:</td>
<td>Faculty</td>
<td>Project:</td>
<td>Faculty Research</td>
</tr>
</tbody>
</table>

**Revision 3.00**

Page 1 of 8
Only faculty members and professional staff who are full-time university employees are eligible for PI status. Students conducting research for their dissertation or master's thesis research can still have primary responsibility for the intellectual content, conduct of the research, or primary authorship in publications by serving as co-investigators or key personnel on IRB applications. If you are a KSU employee conducting research involving human subjects as part of your graduate or undergraduate program, your faculty advisor must complete the KSU portion of the IRB proposal. Please visit the KSU office for PI eligibility and required information.

| Course Requirement | O Other: Specify: |

a. Are there any Kent State University affiliated co-investigators or key personnel on this protocol? Yes ☐ Complete Appendix A(?)  
No ☑

"Key personnel" are defined as individuals who participate in the design, conduct, or reporting of human subjects research. At a minimum, include individuals, who recruit participants, obtain consent or, who collect study data.

b. Are there any external (non-Kent State University affiliated) co-investigators or key personnel engaged in the research? Yes ☑ Complete Appendix B(?)  
No ☑

"Engaged" individuals are those who intervene or interact with participants in the context of the research or who will obtain individually identifiable private information for research funded, supervised, or coordinated by Kent State University. See OHRP Engagement Guidance or contact ORC for more information.

c. Has the Principal Investigator (PI) completed the required web-based course years (CITI, or equivalent) in the protection of human research subjects? Yes ☑ Attach Copy of completion certificate(?)  
No ☑

Educational requirements (initial and continuing) should be satisfied prior to submitting the application for IRB review. See Human Subjects Protection Training policy for more information. Final approval from the IRB will not be obtained until all requirements are verified.

d. Are there other person(s) (e.g., research manager, study or regulatory coordinator, research assistant, etc.) that we should contact if further information about this application is needed? Yes ☑  
No ☑

If Yes ☑ Name:  
Phone:  
Email:  

| a. Does this research have external funding or have you requested external funding for this research? Yes ☐  
No ☑ |

If Yes ☑ Specify sponsor:

Protocol/Proposal#:  
Institution (if not KSU):  
Have all Kent State University investigators and key personnel completed the required COI disclosure for externally funded research for the purposes of this research project? Yes ☑  
No ☑

b. Is any support other than monetary (e.g., drugs, equipment, supplies, etc.) being provided for the study? Yes ☑  
No ☑

If Yes ☑ Specify support and provider:

Attach a copy of the grant application or funding proposal.  

The university is required to verify that all funding proposals and grants (new or renewals) have been reviewed by the IRB before funds are awarded. If the research funded by a federal agency involves a subcontract to or from another entity, an IRB Authorization Agreement may be required. Contact the Office of Research Compliance (ORC) for more information.
c. Does the PI for this research or their immediate family members (i.e., spouse, domestic partner, or dependent children) have a financial interest that would reasonably be affected by the research, or a financial interest in any entity whose financial interest would reasonably appear to be affected by the research?  

Financial interests include (but are not limited to) salary or other payments for services (e.g., consulting fees or honoraria), equity interests (e.g., stocks, stock options, or ownership interests), and intellectual property rights (e.g., patents, copyrights, and royalties from such rights).

<table>
<thead>
<tr>
<th>Yes/No</th>
<th>Yes</th>
<th>Complete Appendix Z 19</th>
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</table>

d. Does the PI for this research or their immediate family members (i.e., spouse, domestic partner, or dependent children) have a non-financial Conflict of Interest that would reasonably be affected by the research?

A non-financial conflict of interest is an interest, other than monetary, of an individual (or his/her immediate family) in the design, conduct, or reporting of the research or other interest that competes with the obligation to protect research participants and potentially compromises the objectivity and credibility of the research process.

<table>
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<tr>
<th>Yes/No</th>
<th>Yes</th>
<th>Complete Appendix Z 1f</th>
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**You must indicate an answer to each of the following (5) statements**

1. The research will not expose participants to discomfort or distress beyond that normally encountered in daily life.
   - [ ] True  [ ] Not True

2. The research will not include collection of data where the responses, if disclosed outside of the research, would place the participants at risk of criminal or civil liability or be reasonably expected to result in loss of employment, employability, or reputation.
   - [ ] True  [ ] Not True

3. The research will not involve individuals that are prisoners (involuntarily confined or detained in a penal institution), with restricted ability to leave the institution.
   - [ ] True  [ ] Not True

4. If there is interaction with subjects there will be a verbal consent process or a document that is given to participants to disclose the information:
   - [ ] That the activity involves research
   - [ ] Subject rights
   - [ ] The procedures/what they are being asked to do
   - [ ] Duration of subject's participation
   - [ ] That participation is voluntary
   - [ ] Confidentiality statement
   - [ ] Incentives or payments (if applicable)
   - [ ] Name and contact information for the investigator
   - [ ] Contact information for the KSU IRB (330-672-2704)
   - [ ] True  [ ] Not True

5. The research is not subject to FDA regulations.
   - [ ] True  [ ] Not True

---

**Section 4: Category of Exemption**

1. Check one or more categories of exemption for which you are applying.

2. Answer all of the questions for each category that you choose.

To be considered for the Exemption your research can involve only procedures listed in one or more of these categories.

<table>
<thead>
<tr>
<th>Category 1</th>
<th>Educational Settings</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>[ ] True  [ ] Not True</td>
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1. The research will only be conducted in established or commonly accepted educational settings including, but not limited to, schools and colleges. (May include other sites where educational activities regularly occur. For example, boy scout meetings, dance classes.)

2. The research will involve only normal educational practices, such as:
   - (i) research on regular and special education instructional strategies, or
   - (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
### Category 2 - Educational Tests, Surveys, Interviews, Public Behavior Observation

1. The subject population includes ADULTS (>18 years old) and the research will involve only the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior.  
   a. The information will be recorded in such a manner that human subjects CANNOT be identified, directly or through identifiers linked to the subjects.  

2. The subject population includes CHILDREN (<18 years old) and the research procedures will be limited to the observation of public behavior where the investigator will NOT participate in the activities being observed.  
   a. The information will be recorded in such a manner that human subjects CANNOT be identified, directly or through identifiers linked to the subjects.  

### Category 3 - Educational Tests, Surveys, Interviews, Public Behavior Observation of PUBLIC OFFICIALS

1. The research will involve only the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior.  

2. AND (one of the following is true)  
   a) The human subjects are elected or appointed public officials or candidates for public office. (Applies to senior officials such as mayor or school superintendent rather than a police officer or teacher.)  
   b) Federal statute(s) require without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.  

### Category 4 - Existing Data, Documents, Specimens

1. The research will involve only the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens. ("Existing" means existing before the research is proposed to the IRB to determine whether the research is exempt. All material is to be reviewed currently exist at the time of this exemption request.)  

2. The sources of the existing data, documents, records or specimens are publicly available OR the information will be recorded by the investigator in such a manner that participants cannot be readily identified either directly or through identifiers (such as a code) linked to them.
Category 5 – For Public Benefit or Service Programs (Federal)

The project is a research or demonstration project conducted by or subject to the approval of a (federal) Department or Agency and which is designed to study, evaluate, or otherwise examine:

(i) public benefit (e.g., financial or medical benefits as provided under the Social Security Act) or service programs (e.g., social, supportive, or nutrition services as provided under the Older Americans Act);
(ii) procedures for obtaining benefits or services under those programs;
(iii) possible changes in or alternatives to these programs or procedures; or
(iv) possible changes in methods or levels of payment for benefits or services under those public benefit or service programs.

Category 6 – For Taste and Food Quality and Consumer Acceptance Studies

The research involves only a taste and food quality evaluation or a food consumer acceptance study in which

i. wholesome foods without additives will be consumed OR
ii. food will be consumed that contains a food ingredient, agricultural chemical or environmental contaminant that is at or below the level found to be safe by the Food and Drug Administration or is approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

If you have checked Not True to ANY of the questions in the category you have chosen above, your research is NOT EXEMPT FROM ANNUAL REVIEW. Do not complete this application. You must submit a Use of Human Subjects in Research Application.

a. Will any members of the research team be conducting or coordinating study activities at a site other than Kent State University? Research to be conducted at locations other than Kent State University may require a letter of support, another institution’s approval if personnel are engaged or, the execution of an IRB Authorization Agreement. See OHRP Guidance for more information.

b. Is any of this research being conducted outside of the U.S.A?

c. What are the estimated beginning and end dates of the project? December 1, 2013 to May 30, 2014.

d. Briefly summarize the purpose of the proposed research using non-technical language that can be readily understood by someone outside the discipline. Use complete sentences (limit 300 words).

The purpose of this study is to explore the relationship among substance use and perceptions and academic achievement among urban middle school students. Data collected by researchers at Case Western Reserve University (CWRU) at the Prevention Research Center for Healthy Communities (PRCHN), as part of the 2012 Cuyahoga County Middle School Youth Risk Behavior Survey (YRBS), will be used for analysis. The YRBS is a surveillance instrument, developed by the Centers for Disease Control and Prevention (CDC) that explores risk behaviors that lead to the leading causes of morbidity and mortality among youth. The YRBS was administered to middle school students in Cuyahoga County in 2012 and included items that required students to self-report data about their academic achievement, alcohol use, tobacco use, marijuana use,
other drug use and perceptions of harm associated with use. Data related to these specific variables, in addition to self-reported sex, age, grade level, and socio-economic status will be used for analysis. No identifying information was collected as a part of this study administration. SPSS and SAS will be used for analysis. A Data Use Agreement template and letter of support from the PRCHN have been included as appendices. Data will be provided to the PI and Co-PI contingent upon completion of these forms in addition to IRB approval from KSU.

<table>
<thead>
<tr>
<th>Section E: PARTICIPANT IDENTIFICATION, RECRUITMENT, &amp; SELECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Specify the recruitment methods for this study and attach copies of written documents to this application:</td>
</tr>
<tr>
<td>- Personal contact</td>
</tr>
<tr>
<td>- Contact or approach letters</td>
</tr>
<tr>
<td>- Telephone calls (attach copy of script)</td>
</tr>
<tr>
<td>- Brochures</td>
</tr>
<tr>
<td>- Printed advertisements</td>
</tr>
<tr>
<td>- Flyers</td>
</tr>
<tr>
<td>- Internet</td>
</tr>
<tr>
<td>- Home visits</td>
</tr>
<tr>
<td>- Radio or TV (include written text of the advertisement and brief layout of images)</td>
</tr>
<tr>
<td>- Email (include copy of text to be used)</td>
</tr>
<tr>
<td>Specify frequency:</td>
</tr>
<tr>
<td>Other:</td>
</tr>
<tr>
<td>Specify: Not applicable</td>
</tr>
</tbody>
</table>

b. Who will approach or recruit potential participants?

- Principal Investigator
- Research Staff

Other please describe: This study involves the use of pre-existing data. Therefore, the use of recruitment methods is not required.

c. When/how often will participants be recruited? (e.g., via email with 3 reminders sent at specific intervals)

This study involves the use of pre-existing data. Therefore, the use of recruitment materials is not required.

d. Where will participants be recruited? (e.g., doctor's office, classroom, online)

This study involves the use of pre-existing data. Therefore, participants will not be recruited for this study.

e. What steps will be taken to avoid coercion or undue influence in the recruitment of research participants? (e.g., will the potential participants be afforded the opportunity to take material home and discuss the study with family members and/or primary care providers?)

This study involves the use of pre-existing data. Therefore, participants will not be recruited for this study.

a. What is the total number of participants (or number of participant records, specimens, etc.): The number of participants is defined as the number of individuals who agree to participate (i.e., those who provide consent or whose records are accessed, etc.) even if all do not complete the study. The total number of research participants may be increased only with prior IRB approval.

1241

b. Describe the individuals who may participate in the research:

All 7th and 8th grade students attending middle school in Cuyahoga County Ohio were eligible for
participation in this study.

Age(s): 10-16

Section 8: CONFIDENTIALITY OF DATA

a. What format will be used to store participant information? Check all that apply.
   - [ ] Harcopy paper documentation
   - [ ] Audio Tapes
   - [ ] Video Tapes
   - [ ] Database system
   - [ ] Disk (CD ROM, floppy disk, flash drive)
   - [ ] other

Specify:

b. How will the participant information be kept secure and confidential?

No identifying information will be provided for the purposes of this study. Data will be maintained in a password protected file in the secure offices of the PI and Co-PI. Only the PI and Co-PI will have access to the data.

c. Will you be retaining identifying information for purposes of another research project (e.g., keeping participants’ contact information to recruit them for future research)?
   - [ ] Yes
   - [ ] No

If Yes 7 Describe what information will be retained. The information must also be described in the consent form.

[ ] I agree to follow all applicable policies and procedures of Kent State University and federal, state, and local laws and guidance regarding the protection of human subjects in research, as well as professional practice standards and guidelines accepted by good research practice guidelines for investigators, including, but not limited to, the following:

- Perform the research as approved by the IRB under the direction of the Principal Investigator (or Advisor) by appropriately trained and qualified personnel with adequate resources;
- Understand that the parameters of the research cannot be modified without approval by the KSU IRB (except where necessary to eliminate apparent immediate hazards to participants);
- Agree to maintain research-related records (and source documents) in a manner that documents the validity of the research and integrity of the data collected, while protecting the confidentiality of the data and privacy of participants;
- Will retain research-related records for audit for a period of at least three years after the research has ended (or longer, according to sponsor or publication requirements) even if I leave the University;
- Will contact the Office Research Compliance for assistance in amending (to request a change in Principal Investigator) or terminating the research if I leave the University or am unavailable to conduct or supervise the research personally (e.g., sabbatical or extended leave);
- Agree to inform all Co-Investigators, research staff, employees, and students assisting in the conduct of the research of their obligations in meeting the above commitments.

[ ] I verify that the information provided in this Use of Human Subjects in Research application is accurate and complete.

Signature of Principal Investigator

Kele Ding, PhD

Printed name of Principal Investigator

Date 11/08/2013
KENT STATE

Integrity of the data collected while protecting the confidentiality of the data and privacy of participants;
Retain research-related records for audit for a period of at least three years after the research has ended (or longer, according to sponsor or publication requirements) even if I leave the University;

Signatures

Date: __________

Copy and Paste table if additional Co-Investigators/Key Personnel.
INSTRUCTIONS for INVESTIGATORS:  

1. Complete this form to add KSU-affiliated Co-Investigator’s or Key Personnel to research that involves human subjects.
2. Submit this completed document with your application via email attachment. To submit the form with a typed signature the form must be submitted from the Investigator’s @kent.edu email account. If completed form is signed and then scanned as a PDF attachment, the @kent.edu email requirement does not apply.
3. Do NOT begin data collection prior to receiving notification from the KSU IRB that the study/modification has been fully approved.

DEFINITIONS

Key personnel:
Individuals who participate in the design, conduct, or reporting of human subjects research. At a minimum, include individuals who recruit participants, obtain consent, or who collect study data.

Conflict of Interest is a financial interest or other opportunity for tangible personal benefit of an individual or his/her immediate family that may exert a substantial and improper influence on the individual’s professional judgment in exercising any institutional duty or responsibility, including the conduct or design of research.

Financial Conflict of Interest:
An interest of an individual (or his/her immediate family) of monetary value that would reasonably appear to be affected by the research or an individual’s interest in any entity whose financial interests would reasonably appear to be affected by the research. Financial interests include (but are not limited to) salary or other payments for services (e.g., consulting fees or honoraria), equity interests (e.g., stocks, stock options, or other ownership interests), and intellectual property rights (e.g., patents, copyrights, and royalties from such rights).

Non-Financial Conflict of Interest:
An interest other than monetary of an individual (or his/her immediate family) in the design, conduct, or reporting of the research or other interest that competes with the obligation to protect research participants and potentially compromises the objectivity and credibility of the research process.

Immediate Family:
An Investigator’s or Key personnel’s spouse or domestic partner and dependent children.

To complete this form: Single left-click to complete text fields. To check a box, double left-click on the box, then click "checked". Click OK.

Section 1: KSU PRINCIPAL INVESTIGATOR INFORMATION

Last Name: Ding  
First Name: Kele

Title or IRB log number of Research (should match Human Subjects Research Application)

Substance use, perception of risk and the relationship to academic achievement among middle school aged youth
**KENT STATE UNIVERSITY**

**KSU Co-Investigator(s) or Key Personnel**

**KSU CO-INVESTIGATOR(S) and/or KEY PERSONNEL (#1)**

<table>
<thead>
<tr>
<th>Status:</th>
<th>O Co-Investigator</th>
<th>Key Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty</td>
<td>[ ] Faculty</td>
<td>O Graduate Student</td>
</tr>
<tr>
<td></td>
<td>[ ] Faculty</td>
<td>O Undergraduate Student</td>
</tr>
<tr>
<td></td>
<td>[ ] Faculty</td>
<td>O Staff</td>
</tr>
</tbody>
</table>

**Name (Last, First, MI):** Ding, Kele

**E-mail:** kding@kent.edu

**Phone:** 330 672 0688

a. Have Co-Investigator(s)/Key personnel completed the CITI online (or equivalent) training?

- [ ] Yes - attach copy of completion certificate...
- [ ] No

b. Describe the role/activities that this Co-investigator or Key Personnel will perform for this study (e.g., subject recruitment, informed consent):

The PI is a faculty member supporting this student research as part of a doctora1 dissertation. The research is based on the secondary analysis of a pre-existing database. Support for development of specific research questions, data analysis and the completion of the standard 5 chapter dissertation will be provided.

c. Where will the Co-investigator or Key Personnel perform the research activities?

- [ ] at KSU
- [ ] at external research site? complete Appendix [ ]

- Yes - provide explanation below
- No

d. Does Co-Investigator or Key personnel have a Conflict of Interest related to the research?

Refer to definitions above.

- Explanation:

- Yes - provide explanation below.
- No

e. Does Co-Investigator or Key personnel have a patent or, pending patent, or current patent idea that could be conceivably related to this research project?

- Explanation:

- Yes - provide explanation below.
- No

f. Has/will Co-Investigator or Key Personnel receive funds or, other resources (including equipment, devices, etc.) from a Sponsor or funding agency/entity for purposes of this research project?

- Yes - provide explanation below.
- No
APPENDIX AI- Co-Investigator(s) or Key Personnel  IRB LOG NUMBER-----  

KENT STATE UNIVERSITY 

KSU Co-Investigator(s) or Key Personnel 

Explanation:

I agree to follow all applicable policies and procedures of Kent State University and federal, state, and local laws and guidance regarding the protection of human subjects in research, as well as professional practice standards and generally accepted good research practice guidelines for investigators, including, but not limited to the following:

- Perform the research as approved by the IRB under the direction of the Principal Investigator (or Advisor) by appropriately trained and qualified personnel with adequate resources;
- Initiate the research after IRB approval has been received;
- Obtain and document (unless waived) informed consent and HIPAA research authorization from human subjects (or their legally authorized representatives) prior to their involvement in the research using the currently IRS-approved consent form(s) and process;
- Promptly report to the IRB events that may represent unanticipated problems involving risks to subjects or others;
- Provide significant new findings that may relate to the subjects willingness to continue to participate;
- Inform the IRB of any proposed changes in the research or informed consent process before changes are implemented and agree that no changes will be made until approved by the KSU/IRB (except where necessary to eliminate apparent immediate hazards to participants);
- If applicable, complete and submit a Continuing Review of Human Subjects Research application before the deadline for review at intervals determined by the IRB to be appropriate to the degree of risk (but not less than once per year) to avoid expiration of IRB approval and cessation of all research activities;
- Maintain research-related records (and source documents) in a manner that documents the validity of the research and integrity of the data collected, while protecting the confidentiality of the data and privacy of participants;
- Retain research-related records for audit for a period of at least three years after the research has ended (or longer, according to sponsor or publication requirements) even if I leave the University;
- Verify that the information provided in this form is accurate and complete.

Signature: ___________________________ Date: ____________

[ ] Co-Investigator [ ] Key Personnel [ ] Faculty [ ] Graduate Student [ ] Undergraduate Student [ ] Staff

Name (Last, First, MI): Knight, Kristina N

E-mail: knknight10@kent.edu  Phone: 216-338-3403

Have Co-Investigator(s)/Key personnel completed the CITI online (or equivalent) training? [ ]

Describe the role/activities that this Co-investigator or Key Personnel will perform for this study (e.g., subject recruitment, informed consent):

This study is being conducted as part of a dissertation and is based on the use of pre-existing data. The Co-I is a doctoral candidate and will be responsible for the development of research questions, data analysis and incorporation of results as a part of the standard 5 chapter dissertation process.
APPENDIX A Co-Investigator(s) or Key Personnel

KENT STATE UNIVERSITY

KSU Co-Investigator(s) or Key Personnel

i. Where will the Co -investigator or Key Personnel perform the research activities?

at KSU
O at external research site -7 complete
Appendix O

j. Does Co-Investigator or Key personnel have a Conflict of Interest related to the research?

Yes provide explanation below
O No

Explanation: The Co-l is an adjunct faculty and staff member at Case Western Reserve University and works for the department in which the Prevention Research Center for Healthy Communities (PRCHN) exists. The PRCHN collected the data that will be used for this study. This research is being conducted for the purposes of completing a dissertation, is not conducted for or as a part of the role of adjunct faculty or staff, and will not involve any compensation (including payment or salary support).

k. Does Co-Investigator or Key personnel have a patent or pending patent, or current patent idea that could be conceivably related to this research project?

O Yes -7 provide explanation below.
O No

Explanation:

l. Has/will Co-Investigator or Key personnel receive funds or other resources (including equipment, devices, etc...) from a Sponsor or funding agency/entity for purposes of this research project?

O Yes -7 provide explanation below.
O No

Explanation:

I agree to follow all applicable policies and procedures of Kent State University and federal, state, and local laws and guidance regarding the protection of human subjects in research, as well as professional practice standards and generally accepted good research practice guidelines for investigators, including, but not limited to the following:

- Perform the research as approved by the IRB under the direction of the Principal Investigator (or Advisor) by appropriately trained and qualified personnel with adequate resources;
- Initiate the research after written notification of IRB approval has been received;
- Obtain and document (unless waived) informed consent and HIPAA research authorization from human subjects (or their legally authorized representatives) prior to their involvement in the research using the currently IRS-approved consent form(s) and process;
- Promptly report to the IRB events that may represent unanticipated problems involving risks to subjects or others;
- Provide significant new findings that may relate to the subjects willingness to continue to participate;
- Inform the IRB of any proposed changes in the research or informed consent process before changes are implemented, and agree that no changes will be made until approved by the KSU IRB (except where necessary to eliminate apparent immediate hazards to participants);
- If applicable, complete and submit a Continuing Review of Human Subjects Research application before the deadline for review at intervals determined by the IRB to be appropriate to the degree of risk (but not less than once per year) to avoid expiration of IRB approval and cessation of all research activities;
- Maintain research-related records (and source documents) in a manner that documents the validity of the research and
APPENDIX Co-Investigator(s) or Key Personnel IRB LOG NUMBER

KENT STATE UNIVERSITY

KSU Co-Investigator(s) or Key Personnel

integrity of the data collected, while protecting the confidentiality of the data and privacy of participants;
Retain research-related records for audit for a period of at least three years after the research has ended (or longer, according to sponsor or publication requirements) even if I leave the University;
I verify that the information provided in this form is accurate and complete.

Signature _SEE ATTACHMENT - SCANNED SIGNATURE PAGE_ Date

Copy and Paste table if additional Co-Investigators/Key Personnel.
### INSTRUCTIONS for INVESTIGATORS:

1. Complete this form to provide details to the IRB for consideration when reviewing research that involves human subjects.

2. Submit this completed document with the Human Subjects Research application via email attachment to the IRB office at kiehl@kent.edu. To submit the form with a typed signature, the form must be submitted from the Investigator’s @kent.edu email account. If completed form is signed and then scanned as a PDF attachment, the @kent.edu email requirement does not apply.

3. Do NOT begin data collection prior to receiving notification from the KSU IRB that the research project/modification/annual review has been fully approved.

### DEFINITIONS

**Financial Conflict of Interest:** An interest of an individual (or his/her immediate family) of monetary value that would reasonably appear to be affected by the research or an individual’s interest in any entity whose financial interests would reasonably appear to be affected by the research. Financial interests include (but are not limited to) salary or other payments for services (e.g., consulting fees or honoraria), equity interests (e.g., stocks, stock options, or other ownership interests), and intellectual property rights (e.g., patents, copyrights, and royalties from such rights).

**Non-Financial Conflict of Interest:** An interest other than monetary of an individual (or his/her immediate family) in the design, conduct, or reporting of the research or other interest that competes with the obligation to protect research participants and potentially compromises the objectivity and credibility of the research process.

**Immediate Family:** An Investigator’s or Key personnel’s spouse or domestic partner and dependent children.

---

**To complete this form:** Single left-click to complete text fields. To check a box, double left-click on the box, then click “checked”. Click OK.

### (section 1 - KSU Research Information)

**Title of Study** (should match Human Subjects Research Application)

Substance use and perception of harm, and the relationship to academic achievement among middle school aged youth

### (section II - oisclu)SURE OFPC/ENTIAL CONFLICT OF INTEREST IN RESEARCH WITH HUMAN SUBJECTS

In the space below please provide information regarding any financial interest (including salary or other payments for services, equity interests, intellectual property rights, patents) or receipt of equipment that could reasonably appear to affect your research involving the use of human subjects:
The Co-I is a doctoral student at KSU that is using data collected by and otherwise owned by her employer Case Western Reserve University. The Co-I is also an adjunct faculty and staff member at Case Western Reserve University and works for the department in which the Prevention Research Center for Healthy Communities (PRCHN) exists. The PRCHN collected the data that will be used for this study. This research is being conducted for the purposes of completing a dissertation. This research project is not conducted for or as a part of the role of adjunct faculty or staff, and will not involve any compensation (including payment or salary support).

**Section III - Affirmation:**

In submitting this form to Institutional Review Board, from your Kent State University email account, you certify that the above information is true. In doing so, you accept responsibility for and understand that significant financial interests must be disclosed to the IRB as new reportable significant financial interests are obtained regarding this project.

**Signature:** SEE ATTACHMENT – SCANNED SIGNATURE PAGE

**Date:** 11/8/13
APPENDIX Z- COI

KENT STATE UNIVERSITY

CONFLICT OF INTEREST DISCLOSURE

The Co-I is a doctoraial student at KSU that is using data collected by and otherwise owned by her employer, Case Western Reserve University. The Co-I is also an adjunct faculty and staff member at Case Western Reserve University and works for the department in which the Prevention Research Center for Healthy Communities (PRCHN) exists. The PRCHN collected the data that will be used for this study. This research is being conducted for the purposes of completing a dissertation. This research project is not conducted for or as a part of the role of adjunct faculty or staff, and will not involve any compensation (including payment or salary support).

In submitting this form to Institutional Review Board, from your Kent State University email account, you certify that the above information is true. In doing so, you accept responsibility for and understand that significant financial interests must be disclosed to the IRB as new reportable significant financial interests are obtained regarding this project.

Signature: [Signature]

Date: 11/9/13
Awarded To

Kristina Knight

This researcher is certified through July 30, 2015 per the Continuing Research Education Credit Program. CREC requires researchers to earn 12 credits per three-year period through human subject research ethics educational seminars and online training. The CREC Program is in compliance with NIH human subjects research educational requirements. Sponsors may obtain additional information about the program at: http://crec.case.edu

Tracy Wilson-Holden
Director, Research Integrity and Education
Office of Research Compliance
Case Western Reserve University

IRB Advisory Committee Members:
Case Western Reserve University
University Hospitals of Cleveland
The MetroHealth System
The Louis Stokes Cleveland VAMC
The Cleveland Clinic Foundation
Institutional Review Board
Division of Research and Sponsored Programs
Kent State University
Cartwright Hall
Kent, Ohio 44242

October 14, 2013

To the Members of the IRB Committee:

This letter is written in support of Kristina N. Knight, a doctoral candidate at Kent State University, related to the use of Youth Risk Behavior Survey (YRBS) data for her dissertation. I am currently an Assistant Professor in the Department of Epidemiology and Biostatistics and Associate Director of the Prevention Research Center for Healthy Neighborhoods (PRCHN) at Case Western Reserve University (CWRU). I am also serving as the outside faculty member on Ms. Knight’s dissertation committee.

Since 2001, CWRU has collected data utilizing the YRBS among middle and high school youth within Cuyahoga County. The YRBS is a nationally developed surveillance tool that explores common risk behaviors among adolescents. This research is currently approved by the Case Western Reserve University Social and Behavioral Science IRB as protocol number IRB-2012-274 (exp 10/20/2014). Based on the parameters established as a part of this protocol, secondary analysis of existing data can be conducted with completion of a PRCHN Data Use Agreement form. A copy of the PRCHN Data Use Agreement has been provided with this IRB application.

Because Ms. Knight is a student at Kent State University (KSU), it is my understanding that she must also submit and receive approval from the KSU Institutional Review Board (IRB). Ms. Knight has requested use of the 2012 middle school YRBS database to explore the relationship between substance use and academic achievement in middle school-aged adolescents. Upon approval of the KSU IRB and the PRCHN Data Use Agreement, the requested data will be provided to Ms. Knight.

I look forward to working with her toward the completion of this project. To that end, she has my support and permission to move forward as indicated. Should you need further information, please contact me by phone at 216-368-0098 or e-mail at Erika.Trapl@case.edu.

Thank you in advance for your consideration.

Cordially,

Erika S. Trapl, PhD
Assistant Professor, Epidemiology & Biostatistics
Associate Director, Prevention Research Center for Healthy Neighborhoods
Case Western Reserve University

Prevention Research Center for Healthy Neighborhoods  -  www.prchn.org
10900 Euclid Avenue, Cleveland OH 44106 - 7089 - Phone: (216) 368-5042 Fax: (216) 368-1918
Data Use Agreement
with
Prevention Research Center for Healthy Neighborhoods, Department of Epidemiology and Biostatistics, Case Western Reserve University

In order to protect the anonymity of respondents who participate in research conducted by the Prevention Research Center for Healthy Neighborhoods (PRCHN), Department of Epidemiology and Biostatistics, Case Western Reserve University (CWRU), the undersigned researcher who will be using data collected in the study

Study Title

P.I. Name

Study/Student Coordinator Name

Data Collection Dates
(herinafter called “Confidential Data”), agree to abide by the following:

A. All Confidential Data given to the researcher will be de-identified, i.e., will include no subject names, addresses, phone numbers, identification numbers, birthdates, or any data that may personally identify the subjects.

B. The researcher will use Confidential Data only for the purposes he/she outlines in Document 1 referred to in Article F, below.

C. The researcher will not share these Confidential Data with anyone whose name does not appear in Document 2 referred to in Article F, below. "Sharing" includes not only providing Confidential Data received from PRCHN/CWRU as a result of this study, but also providing secondary information obtained from the Confidential Data.

D. The researcher affirms that he/she has the capacity to restrict access to Confidential Data. Such capacity may include, but is not limited to, features of a computer operating system, software that removes electronic images of data from physical storage devices, locking cabinets in which to store the CD-Rs, disks or tapes on which Confidential Data, including back-up copies, are written, and the training of personnel who will handle Confidential Data. The PRCHN reserves the right to judge the adequacy of such protections.

E. The researcher will use the restrictive measures - such as those listed in article D above - to which he/she has access in safeguarding the Confidential Data.

F. The researcher encloses with this agreement the following documents:
   1. a brief description of the research he/she intends to undertake using this Confidential Data
   2. a list of the names and organizational affiliations of all those with whom he/she will engage in this research
   3. a description of the means by which he/she will restrict access to Confidential Data, as outlined in article D, above.
G. The Researcher will report to Dr. Elaine Borawski at Elaine.borawski@case.edu, or Dr. Erika Trapl at Erika.trapl@case.edu, any breach of this agreement within 15 days of discovery of such breach. Upon the PRCHN’s knowledge of material breach of this Agreement by the Researcher, the PRCHN shall provide an opportunity for the Researcher to cure the breach or end the violation. If efforts to cure the breach or end the violation are not successful within the reasonable time period specified by the PRCHN, this Agreement shall be terminated and the Researcher will be required to return all data, as well as any other materials provided by the PRCHN.

H. The Researcher will ensure that any agent, including a subcontractor, to whom he/she provides the Confidential Data, agrees to the same restrictions and conditions that apply through this Agreement to the Researcher with respect to the Confidential Data.

I. The parties understand that individuals who are the subject of this study are not intended to be third party beneficiaries of this Agreement.

J. Each party shall be responsible for its own negligent acts or omissions and the negligent acts or omissions of its employees, officers, and directors.

K. No modification of this Agreement may be made without the written consent of both parties.

L. The terms of this Agreement shall be effective upon full execution of this Agreement and shall remain in effect until all Confidential Data is destroyed.

M. Prior to submission to a scholarly journal or for presentation during an academic conference, the Researcher will abide by the review requirements established by Center funding partners and at minimum will reference the source of funds that permitted the data collection.

IN WITNESS WHEREOF, the parties here to execute this agreement as follows:

Researcher Signature:

Typed Name: 
Title: 
Address: 
E-mail: 
Phone Number: 

Prevention Research Center for Healthy Neighborhoods 
Signature: 

Erika A. Trapl, PhD, Associate Director 
Prevention Research Center for Healthy Neighborhoods 
BioEnterprise Building 
10900 Euclid Avenue 
Cleveland, OH 44106-7069 
Erika.Trapl@case.edu 
216-368-0098
Brief description of the research he/she intends to undertake using this Confidential Data

The purpose of this study is to explore the relationship substance use, perception of harm, and academic achievement among middle school students. Data collected as a part of the 2012 Cuyahoga County Middle School Youth Risk Behavior Survey (YRBS), will be used for analysis. The YRBS instrument included items that required students to self-report data about their academic achievement, alcohol use, tobacco use, marijuana use, and prescription drug use as well as their perception of risk or harm. Data related to these specific variables, in addition to self-reported sex, age, grade level, and socio-economic status will be used for analysis utilizing SPSS and SAS.

List of the names and organizational affiliations of all those with whom he/she will engage in this research

1. Kele Ding, PhD
   Associate Professor
   Health Education and Promotion
   Kent State University

2. Kristina Knight, MPH
   Doctoral Candidate
   Health Education and Promotion
   Kent State University
   Director of Community Initiatives & Assistant Program Director
   Master of Public Health Program
   Case Western Reserve University

Description of the means by which he/she will restrict access to Confidential Data, as outlined in article D, above.
No identifying information will be provided by the PRCHN as a part of this study. Only the individuals identified above will have access to the data. Data will be stored on a password protected computer, as part of a password protected file, within the secured university offices.
APPENDIX B

KSU IRB APPROVAL
APPENDIXB

KSU IRB APPROVAL

FW: IRB Level I, category 4 approval for Protocol application #13-506 - please retain this email for your records

DING, KELE <kling@kent.edu>      Mon, Nov 18, 2013 at 1:14PM
To: "Kristina Knight (knk4@case.edu)"<knk4@case.edu>, "SYMONS, CYNTHIA"<csymons@kent.edu>

Here is the final approval. Kristina, can you keep for your record?
Thanks!

Dr. Kele Ding
Health Education & Promotion
School of Health Sciences
College of EHHS
Kent State University
Kent, OH 44240

From: Richmond, Alene On Behalf Of RAGS Research Compliance
Sent: Monday, November 18, 2013 12:58 PM
To: DING, KELE <kling@kent.edu>
Subject: IRB Level I, category 4 approval for Protocol application #13-506 - please retain this email for your records

RE: Protocol #13-506 • entitled “Substance use, perception of harm, and the relationship to academic achievement among middle school age youth”

The Kent State University Institutional Review Board has reviewed and approved your application for Approval to Use Human Research Participants as Level I/Exempt from Annual Review research. Your research project involves minimal risk to human subjects and meets the criteria for the following category of exemption under federal regulations:

file:///Users/Kristina/Desktop/KSU%20IRB%20DESKTOP/KSU%20IRB%20Inst%20Approval%20December%202013/222
- Exemption 4: Existing Data, Documents, and/or Specimens

This application was approved on November 12, 2013.

***Submission of annual review reports is not required for Level I/Exempt projects.

If any modifications are made in research design, methodology, or procedures that increase the risks to subjects or includes activities that do not fall within the approved exemption category, those modifications must be submitted to and approved by the IRB before implementation.

Please contact an IRB discipline specific reviewer or the Office of Research Compliance to discuss the changes and whether a new application must be submitted. http://www.kent.edu/research/researchsafetyandcompliance/irb/index.cfm

Kent State University has a Federal Wide Assurance on file with the Office for Human Research Protections (OHRP); FWA Number oooo1853.

If you have any questions or concerns, please contact us at Researchcompliance@kent.edu or by phone at 330-672-2704 or 330.672.8os8.

Respectfully,

Kent State University Office of Research Compliance

224 Cartwright Hall 1 fax 330.672.2658

Kevin McCreary | Research Compliance Coordinator 1330.672.8058 | kmccrea1@kent.edu

Paulette Washko | Manager, Research Compliance 1330.672.27041 PWashko@kent.edu

For links to obtain general information, access forms, and complete required training, visit our website at www.kent.edu/research.
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