Exploring Heart Health in Appalachian Kentucky: Preparing Students for a Healthier Future

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A Healthier Future

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Eastern Kentucky University Honors Program
Presented: December 3, 2013
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“Of all the forms of inequality, injustice in healthcare is the most shocking and inhumane.”

–Rev. Dr. Martin Luther King Jr.
Abstract

While many types of diseases affect thousands of individuals in eastern Kentucky, the impact of none of them can match that of cardiovascular disease (CVD). According to the Center for Disease Control, approximately 40% of the population in eastern Kentucky has or is at risk for CVD due to numerous risk factors including lack of regular physical activity, exposure to first- and secondhand smoking, access to poor or inadequate dietary programs, and cardiovascular associated health problems such as hypertension and diabetes (2012). However, each of these can be partially prevented through proper education and health awareness initiatives, when supported by public education systems. This honors thesis project was designed to assess the current cardiovascular health education administered at the secondary education level at Shelby Valley High School (SVHS) in Pikeville, Kentucky. Via surveys and interviews with almost 200 ninth- through twelfth-graders at SVHS, a snapshot of the problem plaguing eastern Kentucky was revealed. According to the study, approximately 17% of students did not know using tobacco products had detrimental effects on their cardiovascular health. Furthermore, only a third knew the recommended amount of aerobic activity and more than a quarter did not know about local health issues including the diabetes epidemic in Pike County, Kentucky. This information is taken for granted in areas where education for these concerns are available; however, by educating these students, the hope is that this information will make its way into their homes to the families that need it most.
Part One: The Role of Public Health Policy in Secondary Education

I. A Brief Introduction to Public Health

For many, history is often a challenging, yet important feature to recollect on a topic. This frequently occurs directly after the introduction of specific dates, events, and persons that must be remembered in the case of an exam; however, the true nature of history is to not necessarily understand what happened, but why the event occurred. Additionally, the goals of a traditional historian do not necessarily correspond with the regurgitation of technical facts surrounding an event, but the understanding of the humanities stemmed from it. Dr. Bruce MacLaren of Eastern Kentucky University once said in a lecture, “History is not as terrifying when one looks at it through a historian’s point of view.” MacLaren could have not been more correct.

The study of history is often overlooked in fields outside the Humanities and Social Sciences. In other disciplines, emphasis is often placed on the here and now. Rest assured, history plays as much a role in these fields as others. For example, the history of the practice of medicine has guided physicians in improving and revolutionizing bedside manner, surgical techniques, and diagnosing patients. Without a history, a future does not exist. The same can be said for the field of public health. Due to its history, the utilization and implementation of public health policy and prevention strategies have been improved drastically within the last century alone. This section serves to illustrate a brief history of public health in order to create a foundation for understanding this project in its entirety.
According to the American Public Health Association (2013), public health is defined as “the science and art of protecting and improving the health of communities through education, promotion of healthy lifestyles, and research for disease and injury prevention.” Unlike traditional medicine, which emphasizes the individual, public health focuses on communities, regions, nations, or even the global continuum (Skolnik, 2008, p. 6). The philosophy behind public health conveys the idea that the wellbeing of one member can affect others within the community. Therefore, practitioners of public health strive to aid populations of individuals by creating programs and policies aimed at benefitting their society as a whole. Popular examples of national programs sharing public health ideologies include the Gay Men’s Health Crisis—which focuses on HIV/AIDS management in New York City—and Doctors Without Borders—which provides free or reduced healthcare to poor, underdeveloped nations.

Often times, the creation of a public health policy results after an outbreak of discrete, yet related reports of illness or even after widespread disease strikes an area (Skolnik, 2008, p.3). Likewise, the crux of public health is to create and implement strategies to aid and prevent that same outbreak from occurring once again. Those who protest public health initiatives are often blindsided by the true purpose of these programs. In their limited view, they do not see the practicality of the government entering the world of healthcare. Public health, that is, community-based healthcare provides two major positive components: moral fulfillment and economic richness (Nichols, 2012, p. 548). By means of government and private support, public programs fulfill the moral requirement of assisting others when able
while saving thousands, and sometimes millions, of taxpayer dollars. These are often the results of meticulous and careful planning by committees, boards, or even organizations as a whole.

Although limited to journals, newspaper entries, government publications, and, on rarer occasions, oral delivery, understanding the history of public health is essential to recognizing the processes by which we have designed the future goals of it. The field of public health grew tremendously in the 20th century. As a result, the lasting effects of public health include worthwhile achievements such as increased life expectancy, decreased worldwide mortality, and the reduction of several communicable diseases through education and prevention (Turnock 2004). A famous example of the tireless and productive efforts of public health organizations is the smallpox eradication, instrumented by the World Health Organization (WHO) in the 1970’s.

After ravaging over 50 countries and killing approximately 10-15 million people, smallpox quickly became a global issue. Its tightening grip on many countries resulted in mortality rates as high as 30% in the 1950’s. In 1959, WHO adopted a program that would administer vaccinations; however, with the additional support of the United States in 1965, the Smallpox Eradication Unit (SEU) was created with the goal of vaccinating and treating the populations in those countries still facing the epidemic. The last case of smallpox was reported in Somalia in 1977, but by 1980, WHO declared smallpox the “first disease in history to have been eradicated” (Skolnik, 2008, p.11). Therefore, public health has an important place in the society in which we live.
II. **Public Health and the Education System**

Richard Skolnik (2008) asserts that health and education are linked in three major ways. First, both are heavily dependent on generational advancements. In short, the “health and education of parents affects the health and education of their children” (p. 50). Second, malnutrition and disease, both factors often associated with socioeconomic class, affect the child’s ability to attend, participate, and learn in school. Students who are often sick may be absent frequently, negatively impacting their education and intellectual growth. Finally, education is linked to the prevention of many illnesses. The cornerstone of public health programs is to provide areas with the education needed.

However, one of the problems facing public health is providing education and promoting awareness for diseases in areas lacking the proper resources. This is where the link between the education system and public health policy thrives. These channels are often abused in order to increase awareness to students about various health topics, especially those that are more pertinent to them. The first noticeable form of public health in the education system was the implementation of Head Start in 1965 (Cohen, 2013, p.1). The goal for this program was to offer parents an opportunity for their children to receive publicly funded education prior to kindergarten. This education would serve as a foundation for students entering kindergarten the following year.

Moreover, biologists, psychologists, and sociologists have identified the early years of childhood as a critical time in human development. Many of the first
patterns of speech as well as other educational boundaries are broken as early as at one and half years, suggesting children begin simple learning at a very young age. Although educating students in preschool about health concerns may not instrument a huge difference, research suggests exposing students to health-related information at young ages may result in the adapting of proper dietary and physical habits associated with good health (Cohen, 2013, p. 2).

Although the state of Kentucky requires a health education course at the secondary education level, Cohen argues that not only is early exposure important, but the quality of that education is also significant when assessing education as a determinant of health (2013, p.3). The quality of education in public health is vital, but the role of health in education is equally important. Students who shared their previous experiences with health education mentioned other important facets of health pertaining to teens—sexual health, high risk behaviors, and school-based health, to name a few. However, the topic of cardiovascular health was rarely mentioned, a surprising discovery considering the region in which the study takes place.

III. Introduction to Rural Pike County, Kentucky

As with all states, Kentucky is divided into regions: Bluegrass, Jackson Purchase, Pennyrile, Western Coal Fields, Eastern Coal Fields, and Knobs Arc. Public health, when applied to communities, often focuses on geographical or social boundaries developed by researchers or the persons within the cohort. In this case, Kentucky is divided into fifteen area development districts (ADD). For the scope of
this project, the focus will be on the Big Sandy ADD, but more specifically, Pike County, Kentucky. It will serve as a synecdoche for eastern Kentucky.

Geographically placed as Kentucky’s easternmost point and located directly within the Appalachian mountain range, it is known as “Coal Country” and home to approximately 64,178 individuals (Census 2010). Life in the mountains, valleys, and hollows of Pike County is simple. People there are genuine and brotherly; however, their problems are not scarce. As with many places in the United States, Pike County houses many social, economic, and health problems. Comparable with other rural areas in eastern Kentucky, economic infrastructure are also limited to few large business, many small businesses, chain restaurants, and, of course, the mining and natural gas industries. Due to limited access, healthcare in rural areas is often lacking. As a result, illnesses and diseases often plague these areas. One of the diseases that affect eastern Kentucky substantially is cardiovascular disease.

Despite declining rates over the last few decades, cardiovascular disease remains to be the number one killer of Americans (Jenkins et al. 2004). According to the Center for Disease Control (2013), approximately 1 out of 4 deaths in Kentucky are a result of cardiovascular disease. However, for the Big Sandy ADD, this reality is faced by about 1 out of every 3 persons (Hacker, 2013, p. 7). This increase in mortality is a direct result of the number of health concerns faced in eastern Kentucky.

First, following a proper diet in eastern Kentucky is a possible, yet challenging obstacle. Although schools in Pike County restrict dietary programs by limiting both quality and quantity of unhealthy options to their students, the
remainder of the student’s nutritional needs are supplied by their family once they are home. The result can be detrimental for those families facing financial limitations. These families may be more apt to purchase cheaper, faster food options as opposed to the average middle class family that purchases and prepares a well-balanced meal.

Second is the lack of readily available opportunities to exercise. Although students engage in physical activity at school in their physical education courses or perhaps by visiting the local YMCA center, the latter option is difficult for those living 15 or more mountain road miles from Pikeville city. The geographic location of Pike County essentially sequesters it from many opportunities that urban and suburban areas have. Some students resort to exploring their mountainous areas or carpooling to various parks and religious centers that provide students with basketball goals, playground equipment, and access to gymnasiums. The result for the other microcosm of eastern Kentucky is obvious health risk factors that place the student on the path to developing cardiovascular disease.

According to the annual report by the Kentucky Behavioral Risk Factor Surveillance System pertaining to area development districts (2013), nearly three-quarters of the adults in the Big Sandy ADD are clinically overweight or obese with body mass indices (BMIs) of 25 or greater. In addition, one-third reports they are smoking two or more packs of cigarettes daily and almost one-fifth are diagnosed with diabetes (Hacker, 2013, p. 7). These health concerns cannot be ignored, especially when those who are seeking help are unsuccessful due to financial or social stressors.
For example, Anna Whalen, a 65-year old senior living 24 miles away from Pikeville city, said, “I have to rely on family and friends to take me to my doctor’s appointments and it’s a long 35 minute drive. I offer breakfast and gas money to those who take me, but even then I’m severely limited. Sometime I have to choose between seeing the doctor and providing for my grandson.” When choosing between providing food and shelter for her grandson for whom she cares or visiting the doctor regularly, she would rather provide for a life then prolong her own. “He’s healthy, goes outside and plays, and tells me he’s thankful. That’s all I really need,” she adds.

As a result of this healthcare injustice, this project was designed to address the needs of a community that has been in the dark for nearly fifty years. President Lyndon Johnson personally visited Martin County (two counties southwest of Pike) on April 24, 1964 to declare the end to the War on Poverty in these areas that is causing health detriments to rise (Herald-Leader 2013). Education can lead to the awareness and prevention of cardiovascular disease in rural Appalachian Kentucky, especially when addressed to a student population who could utilize this information in their own lives as well as share this information with their families, friends, and coworkers.
Part Two: The “Shelby Valley High School Youth Cardiovascular Health Awareness” Project

I. Project Setup

Planning for this project began in October 2012. After meeting with Linda Frost, the Director of the Eastern Kentucky University Honors program from July 2006 to June 2013, I contacted Shelby Valley High School (SVHS) and scheduled a meeting with Principal Gregory Napier regarding choosing SVHS as my project site. As a graduate of Shelby Valley, it was a location with which I was already familiar. I had taken several courses from a variety of faculty as well as was accustomed with the community-at-large. Mr. Napier was delighted to have a returning student choose to pursue thesis-level work at his high school. Almost immediately, he contacted several teachers, helping me to build support staff before the project dates of March 11-15. After gaining his permission to use Valley as my project site, I continued to prepare for my project.

Since my project utilizes student participation and responses, it needed to be reviewed and certified first by the Eastern Kentucky University Institutional Review Board (EKU IRB). Therefore, I prepared my application in January 2013 and submitted it for review the first week of February. Some of the documentation requested by EKU IRB included consent, assent, and an informed consent forms. Other documentation that would be used in the response collection portion including the actual heart health surveys and a scripted presentation also needed to be reviewed and approved.
I received project approval the third week of February precisely three weeks before the scheduled project dates. Soon after, I contacted Mr. Gregory Napier to begin distributing parental permission forms. Due to the nature of the study, a student needed a signed parental permission form in order to complete the survey. A student under the age of eighteen with no signed parental permission form cannot legally give assent to participate in the study. Before distributing, I emailed numerous teachers regarding using their classes; several were interested. Among those who returned my response were Misses Cynthia Johnson, Linda Little, and Ava Smith. These teachers represented various levels of high school English, Math, and History, respectively. The teachers were each given a copy of my invitational letter as well as the parental permission form. Based on the sizes of their classes, they distributed them to their students for their parents to review. They were also asked to collect them from the students and bind them until they could be collected during the project dates.

Although the teachers were directly involved in the parental permissions process, they were prohibited from seeing any preliminary data or student responses. These were personally handled and stored on my personal computer; they were not shared with anyone else. On the days of the project, I had to exclude several students from the survey portion if they had not successfully acquired parental permission; however, these students elected to remain in the classroom for the lecture portion even though they were offered an alternative assignment from their teacher.
II. Project Goals

Awareness is a powerful tool. Although it is unrealistic to think that any diseases or problems can be completely eradicated merely by making individuals aware of them, it is still feasible that knowledge can make a difference. Therefore, the crux of my project, although interested in what students already knew, was centered on the idea of educating students about the reality of poor cardiovascular health, a huge problem in eastern Kentucky. By educating students, my hope is that they will take this information to their friends and families, creating a widespread effect that may potentially change the health status of many.

When deciding the objectives for my project, I started from a fundamental perspective. The direction of my project was determined at identifying the problem and not necessarily any solutions. Therefore, three main goals were associated with my project:

1. Disseminate the prevalence of cardiovascular health awareness practices at the secondary education level, specifically in a rural high school.

2. Quantify the societal health impact of cardiovascular disease (CVD) within a certain population.

3. Enumerate and improve the knowledge of students in regards to the topic of cardiovascular health and CVD prevention.

In order to achieve the first goal, I simply had to ask students when and if they had previous instruction on cardiovascular health. Although it was not included in the original survey, the question was asked in addition and certified by students with
assent statements. Each student was notified that they did not have to answer this question, and many chose not to, but the majority was glad to share. Furthermore, I asked personnel as well as the current health teacher what standards of education were met when planning the health curriculum, specifically cardiovascular health education.

The second goal of my thesis involved asking students about the relationship of cardiovascular diseases to themselves and their family. It was asked in a broad sense, not to uncover private medical information, and was once again left completely optional to the student. However, several students left comments regarding the health statuses of either themselves or immediate families; those comments will not be shared in the context of this thesis. Likewise, the number of survey responses from students that initiated this type of response was, in fact, higher than expected. Many were not reluctant to share private medical information. The second goal, if accomplished, would give my project a sense of urgency and purpose.

Finally, the third goal pertained to the lecture delivered to the students. Traditional classroom pedagogy teaches that PowerPoint-based lectures are often boring and ineffective; however, using campus resources as well as many hours of practice allowed me to create a presentation that would be interesting and fun to deliver. Information associated with traumatic events is often remembered. Therefore, much of the presentation, although in a serious tone, used techniques that would help the students retain the information. This included examples, personal stories, and even the occasional joke or pun.
While transitioning from phase-to-phase in my project, these goals were kept in mind. Referring to these goals often helped me to maintain focus during execution of the project. This was important due to the time constraints; every day was important.

III. A Day in the Life of a Student at Shelby Valley High School

Shelby Valley High School is nestled away in a peaceful valley of eastern Kentucky. Located directly off of I-23, it is accessible by several surrounding communities including Virgie, Jonancy, Robinson Creek, Pikeville, and Shelbiana (of which its name is derived). Over 85% of the students who attend Shelby Valley depend on public transportation provided and supported by the Pike County Board of Education. The school day at Shelby Valley commences at 8:00AM (with buses arriving as early as 7:00AM) and finishes at 3:10PM. Students arrive at school from many areas within the service area. Similar to the typical Kentucky public school, students take 7 classes per day divided into equal time slots known as “periods”. In addition, they have a brief homeroom meeting every morning as well as both lunch and afternoon breaks. It is during those times that socialization peaks for the average Shelby Valley High School student.

Of the 585 enrolled students, 298 were female and 277 were male. The Free/Reduced lunch program is targeted at students who cannot afford lunch ($1.50) on a daily basis. Notably, 70% of the students were eligible for this program. Students have access to a variety of subjects taught by 34 full-time faculty members. During scheduling season, students can chooses course electives aside from the
mandatory courses they take. Furthermore, the campus is equipped with a Family Resource Youth Services Center Director (FRYSC) and School Nurse, each providing free services students related to their positions. The FRYSC Director provides both financial and material support to students and their families who request them. This includes school supplies, clothes, and even Christmas presents. The nurse directs medical resources to students and is funded by the Board of Education. This was a recent position created in the 2011-2012 academic year. As a result, both of these resources are heavily used.

Taylor Harr, a graduated senior, described his experience at Shelby Valley as being “fruitful and constructive, offering opportunities for improvement not only for myself, but my fellow graduates as well.” The scope of the education at Shelby Valley in past years was to prepare students for careers or technical programs; however, the recent push for students to succeed in university or collegiate degree programs was a new goal set by the current principal, Mr. Gregory Napier. The revised mission statement of Shelby Valley High School declares: graduating each student college and career ready while achieving excellence through unity and pride. The new focus is to prepare students for both the rigors of a collegiate education and practicality of a career.

Students at Shelby Valley High School as well as other public schools in Kentucky have specific requirements that must be met before they can receive their high school diploma. One of these requirements is a physical education (P.E.) course. The P.E. course is designed to get students active during the school day and is often completed during freshman or sophomore year. Another requirement is a Health
course, aimed at informing students about basic nutrition and related health issues specific to their region. Many students reported that they either did not have a cardiovascular health component in either course or the information was minimal and essentially forgotten. Reported by the students, the number not receiving cardiovascular health education reached 53.1% of the population, while the remaining students left comments suggesting they did not know or remember. Allison Belcher, a female sophomore, added, “I have never heard this information before.”

The comments of Allison and other students raise the following questions:

1. In a region defined at the national level by its major health concerns, are these students receiving the proper education that is addressing those needs?

2. Is education an effective means of helping a region that has been facing the same health problems for decades?

The focus of this thesis project was to measure the effectiveness of a cardiovascular health awareness lecture in an effort to not only encourage the addition of this component, but deliver the education to a controlled population that will then share this information with their immediate families in the mountain communities in which they live.

IV. Empirical Data and Results

The project was designed to collect opinions from a variety of academic disciplines and backgrounds. This would provide a fair, unbiased data collection
representative of the entire student body. In order to ensure non-statistical bias, all teachers were given the opportunity to have their classes participate. In the end, several classes from English, History, and Math volunteered. Approximately 200 students participated in the CVD lecture, with over 150 responses to the Heart Health survey. The number that had heard the lecture on cardiovascular health approached nearly 40% of the student body. This was exceptionally great since it surpassed my goal of one-third.

Of those students that participated in the study, only 145 had the necessary forms and gave the required permissions to be used in this study. Notably, they represented approximately one-fourth of the student body. This stands as a well-representative cohort. In addition, 46% were male and 54% were female, accounting for the slightly large female-to-male ratio present in the school. The average education acquired by a student was sophomore level, indicating that the both the health and physical education course had already been completed by most of the students.

Furthermore, in the surveyed population, 65.5% reported that they or a member of their immediate family had been or were currently diagnosed with cardiovascular disease; the national average is 40% for that region (Centers for Disease Control). Furthermore, over half of the students reported they had never received a lecture regarding cardiovascular health, either inside or outside their required Health course curriculum. Moreover, the following charts represent collected data from the project. It is divided by question with an explanation of the
question offered. Data was collected both before and after the lecture was delivered in an effort to measure retention of the information presented in the lecture.
Question 1: Are the heart and corresponding blood vessels major components of the circulatory system?

Are the Heart and Blood Vessels Major Components of the Circulatory System?

<table>
<thead>
<tr>
<th>Percentage of Students Who Answered Correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
</tr>
<tr>
<td>Post</td>
</tr>
<tr>
<td>92.4%</td>
</tr>
<tr>
<td>96.6%</td>
</tr>
</tbody>
</table>

**Figure 2.1.** Question referring to the components of the circulatory system.

The correct answer to this question is yes. In fact, the circulatory system contains many structures pertaining to the heart, including the capillary beds, arteries, veins, and, by association, the lungs and lymph nodes. The answer to this question was offered verbatim in the presentation on the fourth slide. During the prelecture exam, about 92.4% of the students answered this question correctly. This value increased in the postlecture exam by about 4%.
Question 2: Are men more likely to develop cardiovascular disease in their lifetime?

![Bar Chart](chart.png)

**Figure 2.2.** Question pertaining to prevalence of CVD by gender.

The correct answer, in fact, is yes. Many factors contribute to the discussion behind this reasoning, including diet and lifestyle of the average male. Some of these issues bring up gender-specific behaviors that are culturally normalized for both males and females, information that was not explained thoroughly to students. However, the answer to this question was located on slide 7 at the bottom as a factor that affects cardiovascular health. In the prelecture survey, almost half missed this question; however, this significantly improved in the postlecture survey to 84.1%.
Question 3: Are difficulty breathing, poor stamina, and general tiredness signs of overall positive cardiovascular health?

Figure 2.3. Question pertaining to sign and symptoms of poor cardiovascular health.

This question was designed to be easy. The term “positive” indicates beneficial; the symptoms listed do not seem to meet that standard. Therefore, the answer is no. In the prelecture, approximately half of the students answered it correctly. That number increased by about 12% after the lecture was delivered. This question was not explicitly stated in the presentation, but strongly implied during the oral delivery.
Question 4: Is the best way to promote good physical health through diet and exercise?

![Percentage of Students Who Answered Correctly](image)

**Figure 2.4.** Question pertaining to central purpose of physical education and health courses.

The cornerstone of every physical education and health course can be summarized in one statement: eat healthy and exercise regularly in order to maintain good health. A huge emphasis is placed on these ideas in both P.E. and health courses at all levels of education. Therefore, the answer to this question is yes. In both the prelecture and postlecture examinations, almost all students answered correctly. There was an increase in the percentage of those who answered correctly in the postlecture exam, equivalent to 1.4%.
Public health policy discusses the importance of being aware of serious health concerns occurring at both the regional and national level. Although a majority of the participants reported that they or an immediate family had cardiovascular disease, only 63.4% knew that diabetes mellitus type II is a major health problem affecting their community. Pike county as well as other mountainous counties in Kentucky are deeply affected by diabetes and other similar cardiovascular issues. This number increased, however, to 89% after the lecture was delivered. It was found on slide 8 in the presentation and directly discussed with the students as well, few of which provided information that they knew someone with diabetes.
Question 6: Is Diabetes Mellitus Type II usually diagnosed in early childhood?

![Bar chart showing percentage of students answering the question correctly](chart.png)

**Figure 2.6.** Question pertaining to the stigma regarding DBII diagnosis and age group.

The signs and symptoms associated with DBII such as obesity and hypertension have a correlation with age. As a person aged, he or she was more likely to develop these symptoms, which could eventually result in a diagnosis of diabetes mellitus type II. Therefore, the answer to this question is no. This trend is barely present, however, since more young adults and children are being diagnosed with diabetes of both types at a younger age. This question was illuminated and discussed on slide 8 of the oral presentation. Originally, 60% of the students answered the question correctly; however, this number increased by one-third after the lecture was delivered.
Question 7: Is conducting heat one function of the cardiovascular system?

![Diagram](image)

**Figure 2.7.** Questioning pertaining to a function of the circulatory system that is not obvious.

Many obvious functions (i.e. circulation of blood and fluids) take precedent over less obvious functions of the circulatory system. This was designed to be an academic checkpoint. The correct answer is yes. Using a countercurrent approach, heat is transferred from the warm arteries to the cooler veins. This is possible because blood can be warmed and circulated that heat. In the prelecture, 64.8% of the students answered correctly. After being discussed in the presentation on the sixth slide, approximately 86.2% of the students answered it correctly.
Question 8: What is the recommended amount of weekly aerobic exercise?

![Bar Chart: What is the Recommended Amount of Weekly Aerobic Exercise?](image)

**Figure 2.8.** Question pertaining to the American Heart Association recommendations for physical activity.

The American Heart Association (AHA) puts forth guidelines for both dietary and exercise needs. This information is often taught at the primary educational levels as well as distributed by physicians in their medical practice. When posed with a hypothetical recommendation for exercise, only 35.9% of the students knew the recommendation was incorrect. However, after the lecture, the number of students that knew the AHA recommendation nearly doubled. This question was addressed in the PowerPoint presentation on slide 7.
Question 9: Is 6-8 hours of sleep each night recommended for the typical teenager?

**Figure 2.9.** Question pertaining to recommended amount of sleep each night as a teenager.

The rest and relaxation accomplished by long nights of sleep is an extremely important component of the circadian rhythm. When confronted with the recommended amount of sleep for the average teenager, approximately 93.8% of the students knew the recommended amount. After the presentation, that number increased by 3.5%, meaning only a few students missed it after having a lecture about it. These recommendations are also set by the American Heart and were addressed on presentation slide 7.
Question 10: Is metabolic syndrome and body-mass index (BMI) related?

![Is Metabolic Syndrome is Based on the Body-Mass Index?](image)

**Figure 2.10.** Question detailing to the relationship between clinical metabolic syndrome and body-mass index (BMI).

In the clinical setting, metabolic syndrome is diagnosed in males when the waist-to-thigh ratio exceeds 1.0 and in females when the same ratio exceeds 0.9. Notably, the body-mass index gives a ratio of fat to muscle based on height and weight. Any value above 30 is considered obese. Those with large BMI values are often diagnosed with metabolic syndrome due to the clinical disproportion of the waist-to-thigh ratio. Therefore, the correct answer is yes. Prior to the lecture, only 67.6% of the students answered it correctly. That number increased to 82.8% after the lecture. It was discussed in the presentation on the ninth slide.
Question 11: Is tobacco use a risk factor for developing cardiovascular disease?

Various organizations have worked together to create initiatives to assist people in quitting smoking. It has been proven time and time again that cigarettes, cigars, and smokeless tobacco increase the rate of cardiovascular disease development. Only 83.4% of the student population answered this question correctly before the lecture. That number increased by almost 12% once the lecture was delivered. The presentation answered this question verbatim on PowerPoint slide 10.

***
Many students spoke with me after the lecture, sharing their personal stories and opinions regarding cardiovascular health presentations. On the questionnaire, students were asked to rate the helpfulness and clarity of the lecture. The average score was 8.7 out of 10.0. Furthermore, Isaiah Richardson, a Junior, said, “It’s interesting and not talked about enough in school.” On the contrary, students who participated in the survey rated their interest in cardiovascular health at 5.8 out of 10.0 prior to the lecture; admittedly, it increased to 6.7 after students received the information. Students also reported feeling more comfortable talking about the topic, especially with family and friends whom they are most familiar. Before the lecture was delivered, the average score was 7.7 out of 10.0 for comfortableness of sharing; however, that value increased to 8.4 after the lecture was delivered.
Part Three: Thesis Project Implications, Limitations, and Future Directions

I. Data Implications

The data are useless unless they are both analyzed and generalized. First, it is important to state that all eleven heart health questions as well as the comfortableness and interest of the students increased after the lecture. This suggests that the lecturing of cardiovascular health is not a waste of time. In fact, many students learned things about cardiovascular health that they did not know before. This was accomplished by having an academic checkpoint question: one in which most students probably didn’t know and would have to had paid attention to learn. This was the question about the function of the circulatory system (Question 7). The fact that there was a definite improvement in the postlecture survey shows that education can be a powerful tool when spreading awareness about a health issue such as cardiovascular disease. Therefore, this is an acceptable medium for educating students about this or any issue.

However, some of the data collected proposed huge health concerns. Notably, about 17% of the students did not know tobacco use, even the occasional “dip” or smoke, could have adverse effects on their health (Question 11). Information such as this is often construed as common sense or accessible information in areas where educational initiatives are present. As a resident of Pike County, I remember receiving this information early in my education; however, I do not recollect revisiting this topic. A student who wished to be anonymous wrote on his survey
form, “I started using cigarettes when I was 12.” Six years before the legal age, some students even have access to products that are detrimental to their health.

In a conversation with Trenia Napier, an academic research consultant at Eastern Kentucky University who grew up in Clay County, Kentucky, she suggested, “I remember my grandparents saying that they’ve been smoking all of their lives and they have not gotten cancer. This information is then passed to the next generation, desensitizing the stigma that cigarettes are bad for you.” Generation after generation, testimonies of using tobacco without a health consequence suggests that the next generation can do the same. However, this is not completely true. The lifestyle of 100 years ago has drastically changed; more environmental health hazards are available as well as the culture in eastern Kentucky has transformed over the last century. “The culture suggests that elders are right even when they are not,” argues Trenia Napier.

Moreover, barely a third of the students knew the recommended amount of aerobic exercise every week. In a region defined by its health issues, this is an extremely troubling finding. Rural areas are characterized by their close-knit cultures and homes often spaced apart by geographic boundaries such as mountains or farms. As a result, important information is often poorly shared between families. Therefore, the better outlets for information are those intersections where people encounter others such as schools, convenience and grocery stores, and sources of entertainment. Access to these is often limited in eastern Kentucky, which may explain why students did not know or could not remember this information.
Similarly, diabetes has a widespread grip on the residents of Pike County, Kentucky. This information seemed apparent since many of the patients seen at Pikeville Family Clinic had diabetes. The CDC estimates that 40% of the residents in eastern Kentucky have diabetes or other related cardiovascular health issues. Awareness is key to prevention. As mentioned before, 65.5% of the students reported that they or an immediate family have CVD or a cardiovascular related health problem. If the majority admit to it, why is the stigma minimalized? It may well be that students do not pay attention to regional health issues, are not informed of them, and as a result, consider themselves invincible to these issues.

Although the results of the study can be somewhat explained or theorized, question 3, while intended to be simple, was missed at a much higher rate than expected. Students were asked about the signs and symptoms associated with good cardiovascular health; however, those symptoms mentioned are actually related to poor cardiovascular health. This question was not explained directly in the presentation, but it was implied and mentioned. This suggests one of two things: 1) either students misread or misinterpreted the question, by either not understanding it or a lack of clarity in the wording of the statement, or 2) students did not actually know examples related to positive cardiovascular health.

The need for education is there, but the survey suggests that students are not necessarily interested in the topic. Students that do not invest in their education will not gain as much as those who do. Therefore, administrators who teach this information need to do so in a more provocative and engaging way. Many students may consider this information as basic knowledge that everybody already knows.
that; however, the data suggests otherwise. There are many gaps that need to be filled, especially in a sensitive area that has been experiencing cardiovascular health issues for decades—and the problems are only increasing.

This information is essential to the preservation of health of others. Although there is strong evidence that lectures are efficient in providing this information, as with traditional learning, it needs to be reintroduced at various points in the learner’s life. Early introduction establishes base principles—when we learn what is good for us versus what is bad for us to eat—but later implementation and building on what was already established creates connections to the material and helps solidify our understanding. This is true for many of the core subjects (i.e. mathematics) and is also applicable to health concerns.

II. **Project Limitations**

After the project gained momentum in January 2013, some limitations were almost instantly realized. First, in my original proposal, I intended to teach and certify students in Basic Life Saver CPR. After acquiring certification in February 2013, I was hoping to offer classes during the same week of the study as well as the beginning weeks of the summer. However, due to school closings, my project was complete over two days and the students were not in class the rest of the week. Therefore, it was impossible to fit in those classes. I resorted to using the first few weeks of the summer, but that also became an issue since their calendar year ended quite closely to that of Eastern Kentucky University. However, my American Heart
Association membership and certification fees will not be wasted as I hope to offer a few classes at a later date.

Furthermore, I intended to incorporate other high schools within the area. After using Shelby Valley as a pilot school, it was my goal to acquire input from other schools within the county. This also became a trivial task because of the short time frame available to complete both the creative and written portion of the project. Therefore, I placed all of my time and energy into working with Shelby Valley High School. This, of course, would mean that my data would not represent the entire Appalachian region of Kentucky; however, it is plausible to believe a similar trend would occur in areas similar to Pike County, KY.

In conclusion, there is always the possibility that students intentionally left misleading or incorrect information. Although no bias was established, students could have purposely picked only the incorrect answers. When quantifying the survey results, a couple of surveys were not included simply because they missed each question, both pre- and postlecture. Other surveys that were not complete were also not included in the data collection. However, it is my trust that these surveys were filled out properly and honestly by the students who participated in the project.

**III. Future Directions**

Due to the time constraints of the project, it will not be expanded at this time. Conversely, upon graduation and attaining a degree of Master’s in Public Health, I would like to expand this project in the following manners:
1. Incorporate more data from a variety of schools within the Appalachian service region. This would extend beyond the context of eastern Kentucky and into other states including, but not limited to Tennessee, West Virginia, and Virginia.

2. Gain perspectives of community leaders and physicians within these service areas by personal or phone interviews. By assessing perspectives, ideas and challenges can be managed.

The challenge of educating persons in eastern Kentucky exists as a result of the lack of education at the secondary level. Although these ideas are introduced at the primary level, they need to be revisited again in high school in a manner that will engage students and help them understand the importance and relevance of the topic. There are no persons to blame nor would that add any validity to my thesis.

There is a sense of urgency for education to help these areas of Kentucky that are currently facing healthcare crises. With education comes prevention and an opportunity to eliminate the injustice in healthcare that Rev. Dr. Martin Luther King, Jr. referred to. This is just one minor step on the way of an overarching goal: to ensure both health education and healthcare equality for all.
Appendum

Appendix A: Heart Health Survey

Heart Health Examination

Grade: ______________ (For Classification Purposes Only)
Gender: ______________ (For Classification Purposes Only)

Please answer the following questions:

True/False

_________ The major components of the cardiovascular system is the heart and corresponding blood vessels.
_________ Men are more likely to develop cardiovascular problems in their lifetime.
_________ Signs of overall positive cardiovascular health include, but are not limited to, difficulty breathing, poor stamina, and general tiredness.
_________ The best way to promote good physical health is through diet and exercise.
_________ Diabetes Mellitus Type II is a widespread cardiovascular problem in Pike county, KY.
_________ Diabetes Mellitus Type II is usually diagnosed in early childhood.
_________ One function of the cardiovascular system is conducting heat throughout the body.
_________ The recommended amount of aerobic exercise is 20 minute intervals, five days a week.
_________ About 6-8 hours of sleep are recommended each night for a typical teenager.
_________ Metabolic syndrome is based on the body mass index (BMI).
_________ Smoking is not a risk factor for developing cardiovascular disease.

On a scale of 1-10, how interested are you in the topic cardiovascular health?

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Extremely

On a scale of 1-10, how would you rate the helpfulness of the information from the presentation on cardiovascular health?

1 2 3 4 5 6 7 8 9 10
Very Little Moderate Learned Alot

On a scale of 1-10, how comfortable are you discussing cardiovascular health with your family and friends?

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Extremely

Additional Comments:
Appendix B: Heart Health Presentation

Slide 7: Factors that Affect Cardiovascular Health
- Diet: Foods that are high in unsaturated fats lead to diseases such as obesity and metabolic syndrome, both of which impact cardiovascular health negatively.
- Amount of exercise: The recommended amount of aerobic exercise is three days a week of 20-minute intervals.
- Stress levels: Good luck with that. Focus on stress-relieving activities such as exercise, journaling, or writing.
- Amount of sleep: The recommended amount of sleep is about 6-8 hours per night.
- Gender: It is true that men are more likely to develop cardiovascular problems than women in their lifetime.

Slide 8: Diabetes Mellitus Type II
- Major cardiovascular problem in Pike County, KY.
- Component of cardiovascular disease where the body does not produce enough insulin and glucose levels in bloodstream remain higher than normal.
- Major factor relates to diet; usually diagnosed later in life.

Slide 9: Metabolic Syndrome & Body Mass Index (BMI)
- Measure of comparison between weight and height (not 100% accurate).
- BMI = [(mass (lbs))/((height (in))^2)] x 703.
- For males and females, 18.5-25 is normal, 25-29.9 is overweight and above 30 is the standard for obesity.
- Scale does not take into consideration gender.

Slide 10: Risk Factors for CVD
- Smoking, including secondhand smoking.
- Abusing alcohol.
- Unhealthy diet.
- Lack of proper exercise.
- Genetics.
Anonymous. Personal Interview.

Banks, Clint. Personal Interview.


Ambulatory Network (KAN) CaRESS Clinical Trial. *Journal of the American Board of Family Medicine, 19*, 75-84.


Napier, Trenia. Personal Interview.


Whalen, Anna. Personal Interview.