HEALTHY PEOPLE 2020 LEADING HEALTH INDICATORS:

A COMPARISON OF HEALTH ACCESS

BETWEEN STUDENTS IN THE

UNITED STATES AND KENYA

by

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DEDICATION

To my mother, Truphena Mosoti, you have loved me despite my shortcomings, supported my endeavors and most of all you set precedence for education, when you recently went to back to college and completed your nursing degree. For all your sacrifice, tears, and hard work, may this thesis bring you some little joy. I dedicate this thesis to you mother!

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ABSTRACT

Healthy People 2020 (HP2020) is an undertaking by the U.S. Office Of Disease Prevention and Health Promotion (ODPHP) that aims at improving the health of U.S. citizens. Every 10 years, ODPHP assesses Americans current health status against set metrics. From these results, ODPHP develops a new set of measurable health goals known as Leading Health Indicators (LHIs) to be used for the next decade. This research evaluated how U.S. students compare to the HP2020 benchmark LHIs. Second, it compared the U.S. students to students in Kenya in order to advance our knowledge about global health.

An online Qualtrics survey was sent to a random sample of undergraduate students from a U.S. university and three Kenyan colleges/universities. The results from the survey were used to determine if U.S. students met the HP2020 goals by comparing the percentage of students who met the goal to the HP2020 target. In order to compare whether significant differences existed between U.S. and Kenya students, a z-test statistic was calculated.

While the U.S. students met or exceeded many of the HP2020 goals, this research highlights several areas that needed improvement. In comparing U.S. to Kenya, several differences existed in access to healthcare and mental health. Based on our findings, both nations need to address those areas where the students lacked support.

I. INTRODUCTION

The Office of Disease Prevention and Health Promotion (ODPHP, 2020) set objectives for improving health for United States (U.S.) citizens by introducing Healthy People 2020 (HP2020), which included twelve Leading Health Indicators (LHI). This study examines eight of these LHIs and compares a sample of student populations in the U.S. and Kenya to determine national differences. The eight LHIs are: Access to Health Services, Reproductive and Sexual Health (RSH), Mental Health, Substance Abuse, Tobacco, Environmental Quality, Nutrition, Physical Activity and Obesity, and Injury and Violence. To keep the survey pertinent to student populations as well as to reduce survey fatigue, Clinical Preventive Services, Maternal, Infant and Child Health, and Oral health are not included.

The LHI targets have been used in the U.S. to examine the health of Americans. Similarly, Kenya has an initiative known as Vision 2030. The primary goal of Kenya's health initiative is to provide national healthcare coverage for all Kenyans by 2030, improve maternal and child health, increase immunizations, manage non-communicable diseases such as diabetes and hypertension, prevent water borne illnesses, eradicate tuberculosis, and reduce HIV and other sexually transmitted diseases.

The latest data from The World Bank (2019) indicates that the U.S. devotes more funds to health care than any other country. In 2016, the U.S. spent $9,870 per capita, compared to Kenya's expenditure of $66 per capita as shown in Table 1. Using the disparity in spending, the researcher hypothesized a stark difference in healthcare access between the students in both countries. The goals of this research were twofold. First, the

research analyzed the differences in health between U.S. and Kenyan students. Second, it determined whether U.S. students met the current LHI targets.

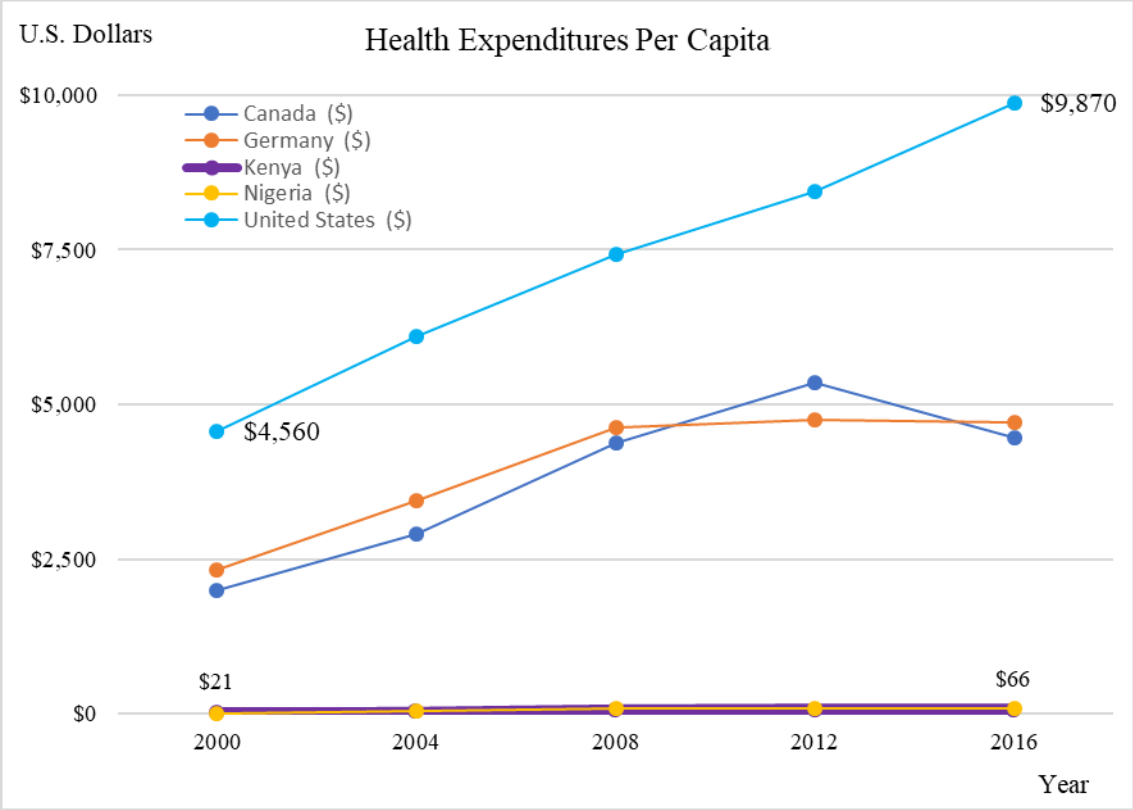

Figure 1. Health expenditures per capita - U.S., Kenya, Germany, Canada & Nigeria (The World Bank, 2019)

II. THEORETICAL FOUNDATION

Access to Health Services

The goals of the first LHI are to ensure that every U.S. citizen has health insurance coverage and access to a primary care physician. The number of individuals with health insurance rose from 83.2% in 2008 to 89.0% in 2018. However, in 2017, the U.S. Congress passed the Tax Cuts and Jobs Act that eliminated the mandated penalty for anyone who was not covered by a healthcare plan (GovTrack.us). Kenya has recently enacted Vision 2030 that proposed a universal and an equitable insurance program to its citizens using the National Health Insurance Fund (NHIF). However only 19% of Kenya's population is currently covered under NHIF (Barasa, Mwaura, Rogo, & Andrawes, 2017), and one percent is covered by other types of insurance (Barasa, Rogo, Mwaura, & Chuma, 2018). The remaining 80% of the population has no insurance coverage.

The HP2020 baseline for individuals having access to a primary care physician was 76.3% in 2007 with the target for 2020 being 83.9%. The proportion of individuals with access to a primary care physician peaked at 77.3% in 2011 but decreased to 76.4% in 2015 as shown in Figure 2 (Office of Disease Prevention and Health Promotion, 2020).

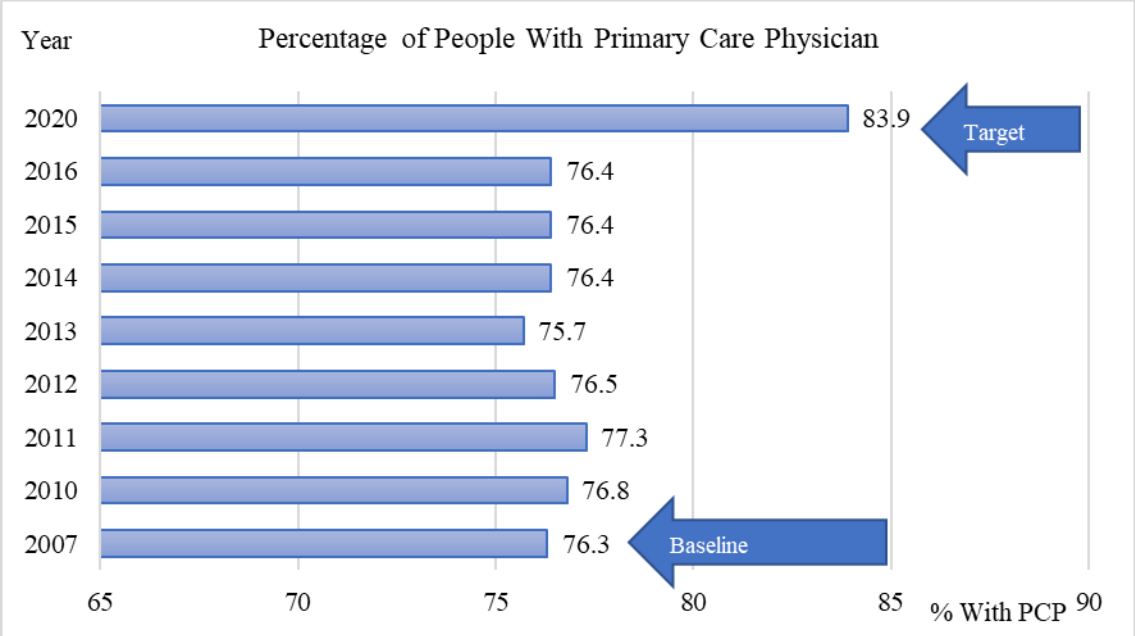

Figure 2. Percentage of people with a primary care provider in the U.S. (Office of Disease Prevention and Health Promotion, 2020)

Access to a primary care physician in Kenya is the equivalent of having access to a clinic or a dispensary. In 2013, the government of Kenya eliminated the fee to visit public health care facilities in order to increase access to healthcare (Calhoun, Speizer, Guilkey, & Bukusi, 2018). While Kenya has only 1.4 nurses per 1.000 Kenyans and only 0.2 physicians per 1,000 Kenyans, the U.S. has 8.6 nurses per 1,000 Americans and 2.6 physicians per 1,000 Americans (World Health Organization, 2019a).

Reproductive and Sexual Health

The Reproductive and Sexual Health (RSH) LHI measure identifies hindrances to achieving adequate reproductive and sexual health services as well as safety measures offered to safeguard against sexually transmitted diseases. The goal of this LHI is to increase the number of sexually active females between the ages of 15-44 who receive RSH services from the baseline of 78.6% in 2007 to 86.5% (ODPHP, 2020). Identifying

the number of females presenting themselves for RSH in Kenya is challenging. For example, maternal health studies in Kenya indicate that there is a dire need for improved services for adolescent parents ages 15-19. Since modern contraceptives are not always offered or available, two thirds of pregnancies in this age group are unintended (Riley, 2019). The number of maternal deaths for the two countries may shed some light as to the disparities. For example, in the U.S., the maternal mortality rate was 19 deaths per 100,000 live births in 2017 increasing from 12 deaths in 2000. While Kenya's numbers have decreased from 708 to 342 deaths per 100,000 live births, the rate is still much higher than the U.S. rate (World Health Organization, 2019b).

Mental Health

The goals for the LHI on Mental Health are to reduce the number of suicides to 10.2 individuals per 100,000 as well as the number of adolescents experiencing depression. While, the ODPHP (2020) noted that mental disorders are the 11th leading cause of death in the U.S., HP2020 results indicate that 11.3 individuals per 100,000 population committed suicide in 2007. However, the rate increased 23% to 14 individuals in 2017. The goal is to decrease the number of suicides to 10.2 per 100,000 people by 2020. In comparison, Kenya's suicide rate is at least 6.5 suicides per 100,000 people. Subsequently, the U.S. and Kenya were ranked 34th and 114th respectively among 175 countries with high suicide rates in 2017 (World Health Organization, 2018).

One of the United Nations' goals is to reduce the rate of premature mortality by one-third for those experiencing mental health issues (Izutsu et al., 2015). Therefore, understanding mental health and providing access to mental health services within the college population is vital. Torrey (2019) noted that mental illness was a factor in many

of the recent mass shootings in the U.S. Thus, students as well as all citizens must be educated on both symptoms of mental illness and resources for treatment.

While the LHI objective for major depressive episodes (MDE) focuses on adolescents between the ages of 12 to 17, the subjects in the present study were college students who are over 18. The American College Health Association (2018) estimates roughly 40% of college students reported experiencing an MDE. Over 5.9% of U.S. citizens and 4.1% of all Kenyans experience depressive disorders (World Health Organization, 2017).

Environmental Quality

The fifth LHI focuses on two measures. First, it assesses air quality and exposure to secondhand smoke for children between the ages 3 and 11 years. The first initiative seeks to decrease the Air Quality Index (AQI) - weighted people days (WPD) that exceed 100. The AQI-WPD measurement combines the two major air pollutants (ozone and particulate matter) that are responsible for over 95% of poor air quality days (airnow.gov, 2019). AQI-WPD has a direct impact on the quality and longevity of life. Globally, seven million deaths are caused by the effects of household and ambient air pollution (Jiang, Mei, & Feng, 2016). The LHI goal for HP2020 is to reduce the AQI-WPD to 7.638 billion. The AQI-WPD decreased from 8.488 billion in 2006-2008 to 4.327 billion in 2014-2016. As long as the U.S. maintains the 2016 recorded levels, the U.S. has met the 2020 goal as shown in the Figure 3 (ODPHP, 2020).

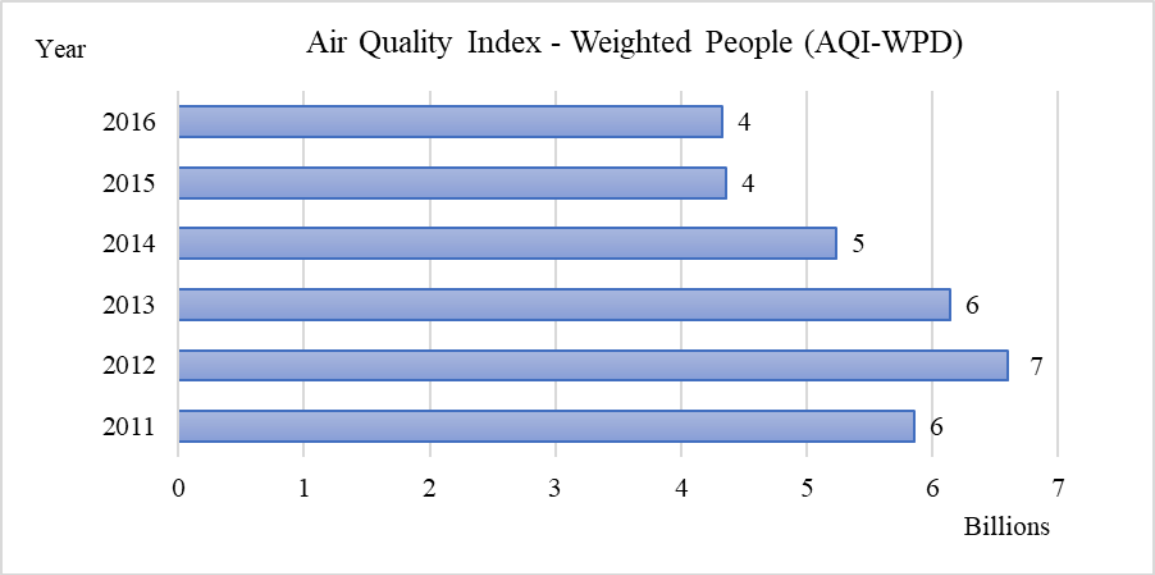

Figure 3. Reduction in the number of days the AQI-WPD in the U.S.(airnow.gov, 2019)

Kenya does not have national level air monitoring data. Data samples were taken using portable air monitoring equipment in the capital city of Nairobi over a two-week period in 2010. The results indicated that fine particles (PM2.5) ranged from 10.7 – 98.1 µg/m3 over the time period (Kinney et al., 2011). To determine the AQI for Kenya, the researcher converted the PM2.5 readings using the Talhelm (2020) calculator. The results indicated that the AQI in Kenya ranged from 45 – 173, which does not meet the HP2020 goal of AQI<100.

The second objective for Environmental Quality LHI was to reduce the number of children experiencing secondhand smoke by 10%. The baseline measured in the years 2005-2008 indicated that 52.2% children aged 3-11 years were exposed to secondhand smoke, which decreased to 38.1% in 2016. According to the Centers for Disease Control and Prevention (CDC, 2019), 40% of U.S. children are currently exposed to secondhand

smoke. Roughly 10% of Kenyan children aged 13-15 are exposed to secondhand smoke (Campaign for Tobacco-Free Kids, 2019).

Nutrition, Physical Activity and Obesity

The Nutrition, Physical Activity, and Obesity LHI explores how a healthy diet and physical exercise can help combat obesity. The physical activity goal suggests that individuals should exercise for at least 150 minutes if the activity is light/moderate or 75 minutes of vigorous aerobic physical activity per week. While in 2008 18.2% of adults met the current federal physical activity guidelines, the rate increased to 24% in 2018 which surpasses the 2020 goal of 20%. On the other hand, The U.S. Department of Health & Human Services (HHS) estimates that less than 5% of adults participate in 30 minutes of physical activity each day, and that one in three adults accomplishes the recommended amount of physical activity each week. Less than 15.4% of Kenyans are physically active or meet the recommended activity amounts (Gathura, 2018). In some Kenyan studies, the rate of physical inactivity was found to be 7.7% (Gichu et al., 2018). Kenya's goal is to reduce the levels of insufficient physical activity by 5% by the year 2023 (Kenya Ministry of Health, 2019).

A healthy diet along with regular physical activity is critical to each age group and greatly reduces the occurrence or onset of certain diseases including obesity, heart disease, diabetes, colon cancer, and high blood pressure (HHS, 2015; HHS, 2002). A healthy diet ensures that the number of calories a body consumes is equivalent to the number of calories that the body burns. If more calories are consumed than burned, the individual gains weight. Certain foods such as whole grains, vegetables, fruits, and nuts are proven to help with disease prevention and weight control. More than half of the U.S.

population is meeting or exceeding grain and protein food consumption recommendations. Three-fourths of the population are following diets low in vegetables, fruits, dairy, and oils. The U.S. population tends to exceed the recommendations for added sugars, saturated fats, and sodium (HHS, 2015).

Previously, Kenyans grappled with malnutrition. The current government's efforts have reduced the number of malnutrition cases. However, individuals choose unhealthy eating habits that result in diet-related complications such as diabetes, cancer, kidney, liver, and cardiovascular diseases (Mohajan, 2014).

The LHI goal for Obesity is a 10% reduction in the number of obese individuals by 2020. The baseline for obesity in 2005–2008 was a Body Mass Index (BMI) of 33.9 among adults over 20 years old, and the goals is to reduce it to 30.5. Obesity was considered a First World problem; however, the problem is slowly spreading to developing countries due to globalization and genetically modified foods. Roughly two out of three U.S. adults are overweight or obese (Harvard School of Public Health, 2019). In Kenya, studies indicate that roughly 7.1% of the population is obese (World Population Review, 2019). Over 43.4% of women are overweight and obese compared to 34% of men in Kenya (CDC, 2018b).

Injury and Violence

The seventh LHI focuses on attaining safety by assessing the statistics for injury and violence that result in death. The goal of this LHI is to reduce injury related deaths from the baseline recorded in the year 2007 of 59.7 to 53.7 deaths per 100,000 people. Murder and homicide rates are low on college campuses (Bennett & Bates, 2015); however, active shooter incidents on college campuses have increased. According to

Rock (2019), 437 students were shot in 190 incidents on 142 college campuses between 2001 and 2016 resulting in 167 deaths. According to the CDC (2018a), more Americans die from violence and injuries from motor vehicular crashes, falls, or homicides than from diseases in the first half of their lives. The CDC indicates that 214,000 people die from injuries annually, which is equivalent to 57.5 per 100,000 people. In contrast, roughly 10% of deaths in Kenya were caused by injury, which Gathecha et al. (2018) indicated aligns with the U.S. trend.

The Clery Act requires college communities to report crime data in order to ensure that communities are aware of the violence that is occurring on their campuses. As noted above, deaths on college campuses are low; however, college and university students are experiencing other forms of violence. For example, Texas State University reported one murder-suicide in 2019. During the 2016-2017 school year, 36 cases of rape and one case of statutory rape as well as 40 cases of dating or domesticate violence were reported (Najmabadi, 2019). The CDC (2018a) indicates that one out of every seven people experiences violence. The sources of injuries can be intentional or non-intentional and range from vehicle accidents to domestic abuse or self-inflected injuries.

Alcohol and Substance Abuse

The LHI goals for Substance Abuse include decreasing the number of adolescents using alcohol and illicit drugs as well as adults engaging in binge drinking and using drugs in the past 30 days from 14.2 % of adolescents between the ages of 12 and 17 in 2015 to 12.8% by the year 2020. According to the National Institute of Alcohol Abuse and Alcoholism (NIAAA, 2007), 53.6% of full-time U.S. college students between the ages of 18 and 22 drank alcohol in the past month, and 34.8% engaged in binge drinking.

The LHI aims at reducing excessive drinking in adults to 25% from a 2015 baseline of 27.8% while reducing binge drinking to 24.2% from 26.9%.

In Kenya, alcohol sales are not regulated. According to the Kenyan National Campaign Against Drug Abuse Authority (NACADA), 2.6% of Kenyan students between the ages of 10 and 19 were consuming alcohol. The strategic plan for NACADA for the years 2009 to 2014 is to reduce alcohol consumption for the youth, with a 24-hour toll-free number where people can seek counseling support (NACADA, 2019).

A staggering number of young Kenyan's are abusing alcohol, drugs, and other illegal substances. According to the World Health Organization (WHO, 2018), 4% of Kenyan's and 4.9% of U.S. citizens die from alcohol abuse per year as shown in Figure 4. Another report indicates that in the U.S., 88,000 people die from alcohol related causes annually (NIAAA, 2015).

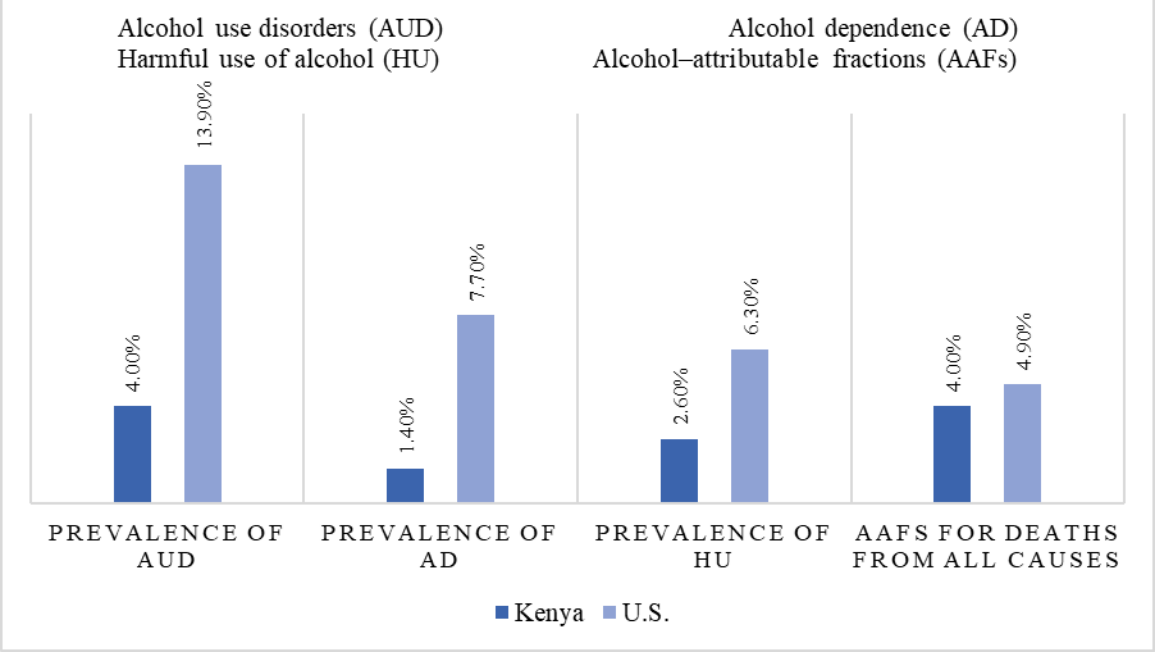

Figure 4. Global status report on alcohol disorders (WHO, 2018)

Substance abuse has seen a prolific explosion globally. Even nations considered Third World countries are grappling with addiction issues. In 1914, the U.S. government passed the Harrison Anti-Narcotic Act, which allowed the government to regulate the sale of narcotics. Due to the lack of interoperability and physicians abusing their prescription writing privileges, the U.S. is facing challenges related to opioid abuse. At the same time, those addicted to opioids are also abusing the system and partaking in other forms of illegal drug activity (Minhee & Calandrillo, 2019). The abuse of opioids stems from users having to increase the dosage of the drug in order to achieve the same effect. This cycle inevitably leads to overdoses and/or adoption and addiction to other more threatening drugs such as heroin since it is cheaper. Deaths stemming from opioid abuse and/or overdose are the leading cause of injury-related deaths in the U.S. In 2017, over 70,000 deaths were from drug related overdoses with 68% of those deaths being attributed to opioids (Scholl, Seth, Kariisa, Wilson, & Baldwin, 2019).

In an attempt to stay ahead of the opioid crisis, the Kenyan Ministry of Health has created a national protocol for the treatment of substance abuse. In this protocol, doctors and other medical professionals received training on the proper prescribing of opioids (Kenya Ministry of Health, 2017). The African continent in general experienced the effect of opioid abuse before 2017. Tramadol was one of the first opioids available on the streets of Africa accounting for 87% of drugs that were seized (Irish Times, 2019; Vice News, 2019).

Roughly16.9% of Kenyan students between the ages of 10 to 19 were using at least one drug or substance (United Nations Office of Drugs and Crime, 2018). In Kenya, individuals in the age range 18-35 tend to use “khat” which is a psychostimulant plant

found in East Africa and southern Arabia (Hoffman & Al'Absi, 2010). When khat leaves are chewed and held in the cheek, they release Cathinone which is a stimulant that is classified as a Schedule I drug under the Federal Controlled Substances Act and Cathine, a Schedule IV drug which makes individuals feel high (Drug Enforcement Agency, 2017). These same individuals also use substances derived from Cannabis (locally known as bhang or hashish). More recently, younger individuals between the ages of 18 and 24 are using drugs like cocaine and heroin (United Nations Office of Drugs and Crime, 2018).

Tobacco Usage

The final LHI is Tobacco Usage. According to the CDC (2018c), tobacco smoking is the leading cause of preventable death in the U.S. This LHI has two goals. The first is to reduce the percentage of adults who smoke from 20.6% in the baseline year 2008 to 12%. The other goal is to reduce the percentage of adolescents who smoke from the baseline year 2009 at 19.5% to 16%. As per the CDC, in the U.S., 14.0% of adults were current cigarette smokers in 2017. In 2018, the CDC reported that 7.2% middle school students and 27.1% high school students reportedly used tobacco. The CDC has a tobacco surveillance system that tracks the global status of tobacco usage, known as the Global Tobacco Surveillance System Data (GTSSD). In Kenya, the GTSSD indicated that 11.6% of adults used tobacco as of 2014. Five in ten adults attempted to quit smoking. In 2013, 9.9% of youth in Kenya used tobacco, and three out of four youths attempted to quit smoking in the past 12 months (CDC, 2018c).

III. HYPOTHESIS

Technological advancements in U.S. industries are evolving rapidly includes. This includes the healthcare industry which has experienced modernization by adopting many new technologies including electronic health record systems. Due to disparities in resources, technology advancements and GDP differences between the two countries, the researcher proposed the following hypotheses. The expectation is that the results of this study will most likely show dissimilarities between students in the U.S. and Kenya.

Hypothesis 1 The proportion of students in the U.S. who have health insurance will be the same as the proportion of students in Kenya.

Hypothesis 1 Alt – The proportion of students in the U.S. who have health insurance will be different from the proportion of students in Kenya.

Hypothesis 2 The proportion of students in the U.S. who sought medical care in the last year will be the same as the proportion of students in Kenya.

Hypothesis 2 Alt – The proportion of students in the U.S. who sought medical care in the last year will be different from the proportion of students in Kenya.

Hypothesis 3 The proportion of students in the U.S. who have a primary care physician will be the same as the proportion of students in Kenya.

Hypothesis 3 Alt – The proportion of students in the U.S. who have a primary care physician will be different from the proportion of students in Kenya.

Hypothesis 4 The proportion of students in the U.S. who have access to reproductive and sexual health services will be the same as the proportion of students in Kenya.

Hypothesis 4 Alt – The proportion of students in the U.S. who have access to reproductive and sexual health services will be different from the proportion of students in Kenya.

Hypothesis 5 The proportion of students in the U.S. who are sexually active will be the same as the proportion of students in Kenya.

Hypothesis 5 Alt – The proportion of students in the U.S. who are sexually active will be different from the proportion of students in Kenya.

Hypothesis 6 The proportion of students in the U.S. who utilize pregnancy prevention methods will be the same as the proportion of students in Kenya.

Hypothesis 6 Alt – The proportion of students in the U.S. who utilize pregnancy prevention methods will be different from the proportion of students in Kenya.

Hypothesis 7 The proportion of students in the U.S. who utilize STD prevention methods will be the same as the proportion of students in Kenya.

Hypothesis 7 Alt – The proportion of students in the U.S. who utilize STD prevention methods will be different from the proportion of students in Kenya.

Hypothesis 8 The proportion of students in the U.S. who have children will be the same as the proportion of students in Kenya.

Hypothesis 8 Alt – The proportion of students in the U.S. who have children will be different from the proportion of students in Kenya.

Hypothesis 9 The proportion of students in the U.S. who have contemplated suicide will be the same as the proportion of students in Kenya.

Hypothesis 9 Alt – The proportion of students in the U.S. who have contemplated suicide will be different from the proportion of students in Kenya.

Hypothesis 10 The proportion of students in the U.S. who know where to get suicide help will be the same as the proportion of students in Kenya.

Hypothesis 10 Alt – The proportion of students in the U.S. who know where to get suicide help will be different from the proportion of students in Kenya.

Hypothesis 11 The proportion of students in the U.S. who have had a major episode of depression in the last 12 months will be the same as the proportion of students in Kenya.

Hypothesis 11 Alt – The proportion of students in the U.S. who have had a major episode of depression in the last 12 months will be different from the proportion of students in Kenya.

Hypothesis 12 The proportion of students in the U.S. who are currently feeling stressed will be the same as the proportion of students in Kenya.

Hypothesis 12 Alt – The proportion of students in the U.S. who are currently feeling stressed will be different from the proportion of students in Kenya.

Hypothesis 13 The proportion of students in the U.S. who have access to programs to prevent or reduce stress will be the same as the proportion of students in Kenya.

Hypothesis 13 Alt – The proportion of students in the U.S. who have access to programs to prevent or reduce stress will be different from the proportion of students in Kenya.

Hypothesis 14 The proportion of students in the U.S. who have concerns about their air quality will be the same as the proportion of students in Kenya.

Hypothesis 14 Alt – The proportion of students in the U.S. who have concerns about their air quality will be different from the proportion of students in Kenya.

Hypothesis 15 The proportion of students in the U.S. who meet the nutritional guidelines will be the same as the proportion of students in Kenya.

Hypothesis 15 Alt – The proportion of students in the U.S. who meet the nutritional guidelines will be different from the proportion of students in Kenya.

Hypothesis 16 The proportion of students in the U.S. who meet physical activity guidelines will be the same as the proportion of students in Kenya.

Hypothesis 16 Alt – The proportion of students in the U.S. who meet physical activity guidelines will be different from the proportion of students in Kenya.

Hypothesis 17 The proportion of students in the U.S. who are at risk of injury and homicidal violence will be the same as the proportion of students in Kenya.

Hypothesis 17 Alt – The proportion of students in the U.S. are at risk of injury and homicidal violence will be different from the proportion of students in Kenya.

Hypothesis 18 The proportion of students in the U.S. who use substances and drugs will be the same as the proportion of students in Kenya.

Hypothesis 18 Alt – The proportion of students in the U.S. who use substances and drugs will be different from the proportion of students in Kenya.

Hypothesis 19 The proportion of students in the U.S. who use tobacco will be the same as the proportion of students in Kenya.

Hypothesis 19 Alt – The proportion of students in the U.S. who use tobacco will be different from the proportion of students in Kenya.

IV. METHODOLOGY

Methods

Using a random number generator, the researcher selected undergraduate students at Texas State University and three higher education institutions in Kenya. A survey was developed to measure the eight LHIs and distributed to the students using Qualtrics. The data collected from these samples compared the percentages of students experiencing or meeting the indicator within each country. A z-test was performed to compare whether a significant difference exists between the responses from the two samples. Z-tests are useful when comparing means or proportions (success rates) between two samples when the answers are binary and/or dichotomous such as yes/no or true/false (Hansen, 2004). The researcher chose the z-test after reviewing similar research that used it. For example, Burcin, Armstrong, Early, and Godwin (2019) used the z-test to explore how to promote health in a college population. Leventhal and Huynh (1996) recommended that researchers should use the z-test for two-tailed nondirectional data when the sample size is greater than 55.

Thus, in order to compare the responses between students in the U.S. and Kenya, a two-tailed z-test was performed on all items that explored true/false or yes/no answers, where the yes or true answers are also known as successes. The results from the z-test confirmed when there was a difference between the proportion of success values in the U.S. versus Kenya. To calculate z-scores, an online z-test calculator tool and formulas entered directly into Excel were used (Social Science Statistics, 2019). In order to perform a z-test, the following three assumptions were considered (Green & Salkind, 2014; Ozgur & Strasser, 2004).

1) The data or observation must be random. The researcher used random samples when collecting data from the U.S. and Kenyan student population.

2) The data must meet the normal condition also known as the "bell curve" or have sufficiently large success or failures. Ghasemi and Zahediasl (2012) recommend the sample size of at least 30 to 40 satisfies this requirement. The sample sizes for U.S. and Kenya at 167 and 144 respectively met the requirement.

3) The data must be independent. In order to meet the independence criteria, the sample size should be less than 10% of the entire population. For U.S. the final sample size was 167, which is much smaller than the 38,000 students enrolled at the university. Similarly, the final sample size for Kenya was 144, which is smaller than the 10,500 students enrolled at the three campuses in Kenya.

Z-Test Calculation

To calculate the z-test, the researcher identified the null hypothesis which tested whether the proportion of students from the U.S. that indicated yes or true was equivalent to the proportion of students from Kenya that did the same for each LHI. The null hypothesis was represented as $\mathbf{H_0: P_1=P_2}$ where $\mathbf{P_1-P_2 = 0.}$ If the null hypothesis was rejected, the alternative hypothesis was supported indicating that the proportion of students from the U.S. for that LHI was different from the proportion from Kenya. This was represented as $\mathbf{H_a: P_1 \neq P_2}$ where $\mathbf{P_1- P_2 \neq 0.}$

Two samples of data referred to as **n1** for the U. S. students who responded to the questions and n2 for the Kenya sample size were gathered. The sample proportions ($\hat{p}$) were calculated by dividing the success value for the sample by the sample size**.** Once the success values and sample proportions were calculated, the alpha (α) level as well as

the critical value were selected. Since the analysis is two-tailed, an alpha (α) of 0.05 was used. The z-score associated with a 5% alpha level for a two tailed analysis is 1.96.

Using the z test formula for two-tailed samples, the z-score is calculated using the following equation: r $\hat{p}_c$ = **(n_1 $\hat{p}_1$ + n2 $\hat{p}$ 2)/ (n1+ n1) for** both samples. To test to ensure you have a large enough sample size, one must test that the n_c* $\hat{p}_c$ > 10. Once all criteria are met, the following formula is used to compute the z-score:

$$Z = \frac{(\hat{p}_1 - \hat{p}_2) - 0}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

Figure 5. Z test equation (Glen, 2020)

Second, to reject the null hypothesis, the z-score must be less than -1.96 or greater than 1.96. In other words, when the null hypothesis that **H_0: P_1=P_2** is rejected, the researcher affirms the alternative hypothesis that **H_a: P_1 ≠P_2** as shown in Figure 3.

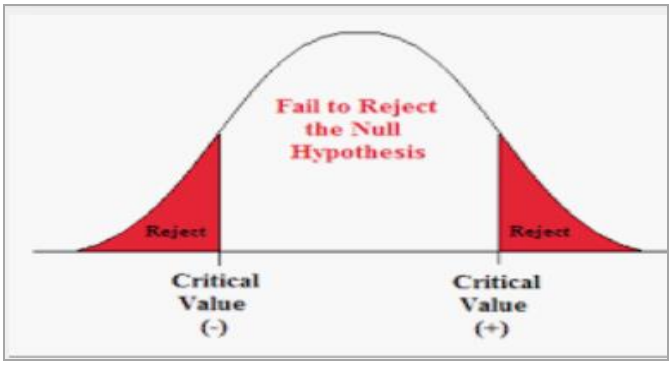

Figure 6. Normal distribution curve (Kiernan, 2013)

Measures

A survey instrument was adopted from a prior study by Topinka, Hewitt, McLeod, and Kruse (2018). Questions were modified when necessary to better measure responses to essential LHI items. To ensure that students in Kenya who are proficient in British English were able to respond to the questions correctly, the survey was modified to reflect British English. In other words, the new survey included both the more common American English term and the British English. For example, clinic was added for the Kenyan students while the American English term is healthcare facility. The survey included 35 questions that explored current health conditions such as weight, height, access to physicians, insurance, dental health, reproductive and sexual health, chronic illness, stress levels, amount of physical exercise individuals engaged in and drug/tobacco usage. The survey items are included in Appendix C.

Data Collection

The target population for this study was college students who were 18 years old and older. The U.S. students received an e-mail invitation to participate in the survey along with two follow-up reminders. Due to inaccessibility to e-mail, 450 randomly selected students from the Kenyan colleges were invited to respond to the study using the messaging app WhatsApp. Two follow-up reminders were sent via WhatsApp one week apart.

V. ANALYSIS

Of the 2,000 students invited to take the survey in the U.S., 185 began the survey; however, eighteen respondents were eliminated due to incomplete responses resulting in 167 surveys being used in the analysis. In Kenya, of the 450 who were invited to participate, 196 responded to the survey; however, 52 were eliminated due to incomplete responses. Thus, 144 responses from the Kenyan students were included in the analysis. The response rate in the U.S. was 8.4% and 32% in Kenya.

Demographics

The distribution for gender of participants was 17% male/79% female in the U.S. compared to 54% male/45% female in Kenya as shown in Table1. The average respondent in the U.S. was 21 years old with a standard deviation of 5.3 compared to an average age of 23 in Kenya with a standard deviation 3.6. The standard deviation indicates that the student ages in U.S. varied more than the mean student ages in Kenya. Meanwhile, 93% of Texas State University participants were U.S. citizens and 98% of Kenyan participants were Kenyan citizens.

Table 1. Number of students who participated

Demographics	U.S.		Kenya	
Sex	Count	Percentage	Count	Percentage
Male	29	17%	76	53%
Female	132	79%	64	44%
Other	2	1%	4	3%
Blanks	4	2%	N/A	N/A
Total	167	100%	144	100%
Citizenship				
United States	156	93%	0	0%
Kenya	0	0%	141	98%
Other - Ecuadorian, Colombia, Cuba, Mexico, United Kingdom	7	4%	0	0%
Blanks	4	2%	3	2%
Total	167	100%	144	100%

VI. RESULTS

The results for each LHI are presented in this section as the number of individuals, the percentage of intervals as well as z-values for those items that can be tested using the z-test. Based on the resulting z-value, the researcher determined whether the two proportions were the same or different. Results of the testing allowed the researcher to either accept the null hypothesis or reject it and accept the alternative hypothesis. The null hypothesis proposes that no significant difference exists between the success values of U.S. versus Kenya.

Access to Health Services

The first goal of this LHI was to ensure that all U.S. citizens have health insurance. Sixteen percent (16%) of the U.S. students and 60% of the Kenyan students indicated that they did not have health insurance coverage. In other words, 84% of the U.S students had some form of insurance coverage compared to 40% of Kenyan students. Since the first hypothesis explored whether the proportion of students who had health insurance in the U.S. was different from those in Kenya, a z-test was performed. The resulting z value was 7.297 (p-value < 0.001), which was greater than 1.96. Thus, the null hypothesis was rejected and hypothesis 1Alt was supported affirming that a difference existed between the proportion of students with health insurance in the U.S. and Kenya as shown in Table 2.

Table 2. Health insurance coverage

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Total with Health Insurance	122	84%	47	40%	7.297	0.000
Public Health Insurance (USA - Obama Care), (Kenya-NHIF) etc.	1	1%	29	25%		
Parent's insurance plan	72	49%	14	12%		
Private insurance through employer or workplace	11	8%	2	2%		
Private insurance from insurance company	3	2%	0	0%		
The military, Tricare, VA	19	13%	0	0%		
Medicaid Medicare	12	8%	0	0%		
The Indian Health Service	0	0%	0	0%		
International Health Insurance	4	3%	2	2%		
No Insurance	21	14%	33	28%		
Cash	3	2%	37	32%		
Total	146	100%	117	100%		

The results as shown in Table 3 imply that 86% of the students from the U.S and 89% of Kenyan students sought medical care within the last year. In order to test hypothesis 2, the z-test was performed with a resulting z-score of -.634 with a p-value = 0.526. The z value falls in the fail to reject region since the z-score is greater than -1.96. Therefore, we failed to reject the null hypothesis implying no differences existed between the proportions of students in the U.S. and Kenya who sought medical care within the last year.

Table 3. Sought medical care

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Total within last year	127	86%	105	89%	-0.634	0.526
Last month	26	18%	29	25%		
Last 3 months	30	20%	37	31%		
Last 6 months	27	18%	24	20%		
Last year	44	30%	15	13%		
Last 2 years	7	5%	4	3%		
Over 2 years	13	9%	9	8%		
Total	147	100%	118	100%		

Table 4 shows the accessibility to different medical facilities. In the U.S., a high percentage of students (57%) accessed care through a primary care physician, while 10% of Kenyan students accessed care from a primary care physician. In contrast, utilization of the on-campus student health center shows a low percentage usage in the U.S. (11%) compared to 58% utilization in Kenya. To test hypothesis 3, a z-test was performed, and the resulting z value was 8.91 (p-value < 0.001), indicating that the null hypothesis can be rejected and hypothesis 3Alt was accepted. These results affirmed that differences existed between the proportion of students with access to a primary care physician in the U.S. and Kenya.

Table 4. Locations visited for regular care

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Primary Care Physician	98	57%	12	10%	8.19	0.000
Student Health Center	19	11%	70	58%		
Outpatient Clinic	32	19%	35	29%		
Emergency Room	17	10%	4	3%		
Other	6	3%	0	0%		
Total	172	100%	121	100%		

The students were asked how long it took them to get an appointment for different types of healthcare. For example, most of the students in the U.S. were able to get an appointment with their primary care physician for a well visits or sick care within a week (60% and 75% respectively); however, it takes a week or more to get an appointment with a specialist (91%). The majority of the U.S. students (77%) were able to access healthcare within a day when faced with an emergency. Students in Kenya often present themselves to walk-in clinics for a well visit or sick care (68% and 91%) respectively, therefore it's common to have accessibility to a healthcare provider within a day regardless of whether the situation is urgent or not as shown in Table 5.

Table 5. Lead time to get an appointment

US					Kenya			
Well Visit	Sick Care	Specialist	Emergency		Well Visit	Sick Care	Specialist	Emergency
28%	41%	10%	77%	1 day	68%	46%	43%	91%
32%	34%	31%	5%	A week	21%	38%	49%	0%
13%	9%	19%	4%	2 weeks	1%	5%	0%	0%
11%	5%	21%	3%	1 Month	2%	6%	0%	0%
6%	4%	8%	3%	2 months	6%	5%	6%	9%
4%	4%	7%	2%	6 months	1%	0%	0%	0%
5%	3%	5%	4%	A year	0%	0%	3%	0%

Reproductive and Sexual Health Services (RSH)

The second LHI of access to reproductive and sexual health services indicated that a high percentage (78%) of students in the U.S. did not use RSH services, which was very similar to the students in Kenya (76%) as shown in Table 6. When determining whether the students use of reproductive services was different between students in the

U.S. and Kenya, the resulting z-value was -0.387. Since -0.39 is greater than -1.96 with a p value of 0.699, we fail to reject the null hypothesis 4, which indicates there is not enough evidence to signify there is a difference between the proportions of students in U.S. and Kenya who have access to reproductive and sexual health services.

Table 6. Access to reproductive services

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Yes	22	17%	12	19%	-0.387	0.699
No	102	78%	48	76%		
Not Applicable	7	5%	3	5%		
Total (female only)	131	100%	63	100%		

Roughly 82% of the students from Kenya revealed that they are sexually active compared to 59% of their U.S. counterparts. To test hypothesis 5a, a z-test was performed. The resulting z value was -4.441 (p-value < 0.001), implying the hypothesis 5 can be rejected and the hypothesis 5Alt was accepted. The results as shown in Table 7 affirmed there was a difference in the sexual activity reported by students between the two countries.

Table 7. Sexually active

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Yes	98	59%	118	82%	-4.441	0.000
No	54	32%	11	8%		
Prefer not to say	10	6%	8	6%		
Unknown	5	3%	7	5%		
Total	167	100%	144	100%		

Accessing and using some form of contraceptives to prevent pregnancy is essential for students who are sexually active. The results in table 8 show that 85% of

sexually active U.S. students and 79% of sexually active Kenyan students use birth control methods. To test hypothesis 6, a z-score was computed. With a z-score of 1.108 (p>.001), the results were within the fail to reject region meaning the null hypothesis cannot be rejected. Therefore, not enough evidence existed to support differences between the proportion of students in U.S. and Kenya that used birth control methods as indicated in Table 8.

Table 8. Pregnancy prevention

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Birth Control	83	85%	93	79%	1.108	0.268
No method used	15	15%	25	21%		
Total	98	100%	118	100%		

When students were asked how they protect themselves from sexually transmitted diseases (STD), U.S. students and Kenyan students indicated they used condoms at 68% and 75% respectively as shown in Table 9. A z value of -1.003 (p>.001) indicated hypothesis 7 cannot be rejected. These results implied no difference existed between the proportions of students in U.S. and Kenya who used condoms for STD prevention.

Table 9. Sexually transmitted disease prevention

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Condom	61	68%	62	75%	-1.003	0.316
None	29	32%	21	25%		
Total	90	100%	83	100%		

Only four of the students in the U.S. (2%) have children compared to 43 of the students in Kenya (30%) as displayed in Table 10. To test hypothesis 8 to determine if

there was a difference in the number of students with children, the resulting z value was -6.743 with a p-value less than 0.001. Thus, the null hypothesis was rejected and hypothesis 8Alt was supported, signifying a difference existed between the proportion of U.S. students and Kenyan students who have children.

Table 10. Students with children

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Yes	4	2%	43	30%	-6.743	0.000
No	156	93%	89	62%		
Blank	7	4%	12	8%		
Total	167	100%	144	100%		

The majority of the children were in the newborns to 5 years of age category, including two in the U.S and 33 in Kenya. These results are shown in Table 11.

Table 11. Children age group

	U.S.		Kenya	
	Count	%	Count	%
Newborn - 5 Years	2	1%	33	23%
6 Years - 12 Years	1	1%	5	3%
13 Years and above	0	0%	1	1%
Total Students Surveyed	167	2%	144	27%

Mental Health

The third LHI explored mental health. In response to the question about whether the students have contemplated or attempted suicide, 43% of the students in the U.S. and 3% of the Kenyan students indicated that they had either contemplated or attempted suicide. To test hypothesis 9, a z-test was performed. The resulting z value was in the rejection area at 7.111 (p-value < 0.001). These results provided support for the alternate

hypothesis (H9alt) implying the proportion of students who contemplated or attempted suicide from the two samples of U.S. and Kenya differed as shown in Table 12.

Table 12. Contemplated or attempted suicide

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Yes, and attempted it	23	16%	1	1%	7.111	0.000
Yes - But never attempted it	38	27%	2	2%		
No	75	53%	100	95%		
Choose not to answer	6	4%	2	2%		
Total	142	100%	105	100%		

As displayed in Table 13 below, majority of the U.S. students (95%) responded that they know where to get help regarding suicide; meanwhile, only 39% of Kenyan students did. The resulting z-score is 11.574 ($p < 0.001$) indicating that the null hypothesis was rejected. Therefore, the alternative hypothesis (H10-Alt) was accepted signifying a difference existed between the proportion of students in the U.S. who know where to get suicide help than those in Kenya.

Table 13. Suicide help

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Yes	135	95%	41	39%	11.574	0.000
No	7	5%	65	61%		
Total	142	100%	144	100%		

Almost half (41%) of the U.S. students and 19% of Kenyan students reported experiencing MDE in the last year as displayed in Table 14. When testing hypothesis 11, the z-Score of 3.735 ($p < 0.001$) suggested the null hypothesis was rejected and

hypothesis 11 Alt accepted. There was a difference between students expressing MDE in the U.S. and Kenya.

Table 14. Major episode of depression in the last 12 months

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Yes	58	41%	21	19%	3.735	0.000
No	59	42%	74	67%		
Maybe	25	18%	16	14%		
Total	142	100%	111	100%		

When asked if they felt stressed, 70% of U.S. students indicated they were currently stressed in contrast to 26% of Kenyan students as shown in Table 15. The null hypothesis 12 predicted that there would be no difference between the two groups. With a z-score of 6.882 ($p < 0.001$), these results indicated the null hypothesis was rejected. Thus, hypothesis 12Alt was accepted affirming that the proportion of students in the U.S. and Kenyan samples who indicated they were stressed was different.

Table 15. Students indicating they felt stressed

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Yes	99	70%	29	26%	6.882	0.000
No	25	18%	69	62%		
Maybe	18	13%	13	12%		
Total	142	100%	111	100%		

When asked whether they had access to programs that help prevent or reduce stress, 70% of U.S. students indicated they had access to some programs compared to 48% of Kenyan students. The z-score of 3.661 ($p < .001$) led to the rejection of the null hypothesis 13 while leading to the acceptance of the hypothesis 13Alt. This affirmed that

the availability of mental health support programs as noted in Table 16 was different between the two countries.

Table 16. Access to programs that prevent or reduce stress

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Yes	100	70%	53	48%	3.661	0.000
No	42	30%	58	52%		
Maybe	0	0%	0	0%		
Total	142	100%	111	100%		

Environmental Air Quality

In Table 17, results from the fourth LHI that measures the students' concerns regarding air quality were displayed. While 26% of U.S. students were concerned about air quality, 23% of the students in Kenya also expressed concern. To test the null hypothesis (H14), the z-score was computed where results showed a z-score equal to 0.503 ($p > .001$) 0.37. These results demonstrate that there is not enough evidence to reject the null hypothesis indicating the concerns for air quality are similar for students in U.S. and Kenya.

Table 17. Air quality concerns

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Yes	32	26%	22	23%	0.503	0.615
No	35	28%	41	42%		
Not aware	58	46%	34	35%		
Total	125	100%	97	100%		

Over 60% of the US students responded that they suffer from illnesses that are aggravated by air quality as shown in Table 18, while 64% of their Kenyan counterparts

made similar claims. To test the hypothesis15, the z-score was calculated and determined to be -0.535 (p>.001). which falls in the fail to reject section. These results indicate the proportion of students in the two countries who experience airborne triggered illnesses are not very different.

Table 18. Illnesses of concern from air quality

	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
Upper Respiratory / Atopic	65	61%	84	64%	-0.535	0.592
None	42	39%	47	36%		
Total	107	100%	131	100%		

Nutrition, Physical Activity and Obesity Reduction

The fifth LHI was comprised of two parts. First, individuals were asked about their eating habits to determine their nutritional intake. The results for both groups were compared with the U.S. Department of Agricultural (USDA) recommendations for individuals between the ages of 18 and 30 years old. For example, the USDA recommended that people between 18 and 30 years old eat at least 2 servings of fruit per day. As indicated in Table 19, roughly 26% of U.S. students consumed at least 2 servings of fruit while only 17% of Kenyan students consumed the recommended amount. Roughly one-fourth (27%) of the U.S. students and (26%) of the Kenyan students consumed the recommended 5 servings of starch per week. Data showed that 27% of U.S. students and 35% of their Kenyan counterparts ate the recommended 1.5 servings of vegetables per day. The recommended amount of dairy is 3 cups per day. Only 8% of U.S students compared to 2% of Kenyan students met the recommended dairy intake per day. On the other hand, the USDA recommended one slice of bread or one cup of cereal or

half a cup of cooked rice per day. Sixty-two percent (62%) of U.S. students met their intake for breads and cereals compared to 48% of Kenyan students. For protein, the recommended amount was 5.5 ounces per day. Roughly 43% of U.S. students met this intake compared to 8% of the Kenyan students. Lastly the Mayo clinic's Dash Diet recommended less than 3 servings per week of candy, cookies, and other sweets. Differences were noted in the amount of dairy, protein, and grains consumed by the two groups.

Table 19. Nutrition

Food Group	USDA Recommended	U.S.		Kenya		z-value
		Did not meet	Met	Did not meet	Met	
Fruit	2 servings/day	71%	26%	76%	17%	1.902
Starch	5 servings/Week	48%	27%	44%	26%	0.733
Vegetables	1.5 servings/Day	49%	27%	35%	35%	-1.612
Lettuce-based salads	1.5 servings/Day	69%	6%	67%	3%	1.361
Dairy servings	3 servings/Day	66%	8%	69%	2%	2.784
Protein	5.5 ounces/Day	32%	43%	63%	8%	7.052
Grains (bread and cereal)	1 slice of bread, 1 cup cereal, or ½ cup of cooked rice	14%	62%	22%	48%	2.434
Candy, cookies, other sweet products	< 3 per Week	12%	63%	1%	69%	-0.023
Junk food	None	43%	32%	28%	42%	-1.826

The second portion of this LHI explored whether the students were getting enough physical activity. The USDA recommended 2 hours and 30 minutes each week of physical activity for adults (that is 30 minutes a day for 5 days) or 1 hour and 15 minutes each week of aerobic physical activity at a vigorous level. As displayed in Table 20, 34% of U.S. students were meeting this requirement, compared to 40% of Kenyan students.

The results indicated the two proportions were similar since the z-value was within the fail to reject region.

Table 20. Physical activity

	U.S. Count	%	Kenya Count	%	z	P-Value
More or equal to 150 Min (Met)	57	34%	58	40%	-1.120	0.263
Less than 150 Min (not Met)	41	25%	30	21%		
No Exercise (not Met)	69	41%	56	39%		
Total	167	100%	144	100%		

The LHI goal for Obesity was a 10% reduction in the number of obese individuals as well as the reduction of BMI from 33.9 to 30.5 by 2020. Based on the results presented in Table 21, 85% of the U.S. students were below the obesity rate while 15% were above. Of the Kenyan sample, 90% were considered not obese while 10% were considered obese.

Table 21. Obesity rates

	U.S.		**Kenya**	
BMI	Count	%	Count	%
< 30	95	85%	38	90%
≥ 30	17	15%	4	10%
Respondents Total	112	100%	42	100%

Injury and Violence

The sixth LHI results in Table 22 display the students' risk of experiencing relationship violence, injury, or death or homicide. A proportion of Kenyan students felt at risk of relationship violence (23%), injury (3%), and death or homicide (3%). The U.S. students did not respond to this question.

Table 22. Risk to injury and violence

	U.S.		Kenya	
	Count	%	Count	%
Relationship Violence	0	0%	33	23%
Injury	0	0%	5	3%
Death or Homicide	0	0%	4	3%
Blank	167	100%	102	71%
Totals	167	100%	144	100%

Alcohol and Substance Abuse

The seventh LHI assessed drug usage and substance abuse. A small number in the U.S. indicated that they used marijuana (22%), opioids (2%), and illicit drugs such as heroin, cocaine, or ecstasy (1%) as shown in Table 23. The Kenyan students did not respond to these questions about drug usage.

Table 23. Drug and substance abuse

		U.S.		Kenya
	Count	%	Count	%
Marijuana/Weed/Bhangi	36	22%	0	0%
Opioids (morphine, fentanyl, hydrocodone etc.)	4	2%	0	0%
Illicit drugs (heroin, cocaine, ecstasy)	2	1%	0	0%
Blank	125	75%	167	100%
Total	167	100%	167	100%

As noted in Table 24, alcohol consumption was lower than expected with well over half the students in both the U.S. and Kenya indicating that they consumed no alcohol (35% and 91% respectively) or 1-4 drinks per month (50% and 9% respectively). Five percent of the U.S. population indicated drinking at least 15-30 drinks per month. In the subsequent testing of hypothesis 20, a z value of 8.623 ($p < .001$) affirmed rejection of the null hypothesis. The researcher therefore accepted the alternative hypothesis (H20 Alt), indicating there was a difference in alcohol consumption between the proportion of students in the U.S. and Kenya.

Table 24. Frequency of alcohol consumption per month

Number of Drinks	U.S.		Kenya			
	Count	%	Count	%	z	P-Value
0	51	35%	102	91%	8.623	0.000
1-4	72	50%	10	9%		
5-14	15	10%	0	0%		
15 - 30	7	5%	0	0%		
Total	145	100%	112	100%		

Tobacco Usage

The eighth LHI included in this study pertained to tobacco usage. Tables 25 and 26 show that eleven percent of the U.S. students smoked tobacco compared to 1% of their Kenyan counterparts. Of the 18 students in the U.S. who smoke, nine of them indicated that they would like to quit smoking. There were only 2 students in Kenya who smoked with one expressing the desire to stop smoking.

Table 25. Tobacco usage

	U.S.		Kenya	
	Count	%	Count	%
Yes	18	11%	2	1%
No	129	77%	118	82%
Blank	20	12%	24	17%
Total	167	100%	144	100%

Table 26. Desire to quit smoking

	U.S.		Kenya	
	Count	%	Count	%
Yes	9	50%	1	50%
No	9	50%	1	50%
Total	18	100%	2	100%

Even though the number of students who were smoking was low, the majority of students were exposed to secondhand smoke. Many students were exposed to secondhand smoke in bars, restaurants, their homes, their friends' houses, or even at work as shown in Table 27.

Table 27. Secondhand smoke exposure

	U.S.		Kenya	
	Count	%	Count	%
Bars	133	80%	89	62%
Restaurants	132	79%	79	55%
At home	133	80%	88	61%
At a friend's	123	74%	80	56%
At work	134	80%	81	56%
Other	40	24%	30	21%

The results from all the testing are summarized in Table 28 and 29. Table 28 shows the results of which hypothesis were supported and in which cases the null hypothesis was rejected indicating that the alternative hypothesis was significant. Table 29 shows the results when the student population was compared to the HP2020 goals.

Table 28. Healthy People 2020 hypothesis testing

Leading Health Indicator	Null	Alt	Z	P
1. Students who have health insurance		✓	7.297	0.000
2. Sought medical care in the last year	✓		-0.634	0.526
3. Have a primary care physician		✓	8.191	0.000
4. Access to reproductive and sexual health services	✓		-0.387	0.699
5. Sexually active		✓	-4.441	0.000
6. Utilize pregnancy prevention methods	✓		0.747	0.455
7. Utilize STD prevention methods	✓		-1.003	0.316
8. Students with children		✓	-6.743	0.000
9. Contemplated suicide		✓	7.111	0.000
10. Know where to get suicide help		✓	11.57	0.000
11. Major episode of depression in the last one Year		✓	3.735	0.000
12. Currently feeling stressed		✓	6.882	0.000
13. Have access to programs to prevent or reduce stress		✓	3.661	0.000
14. Concerns about air quality	✓		0.503	0.615
15. Concerns about air quality triggered illnesses	✓		-0.535	0.592

Table 28. Continued.

16. Meet the nutritional guidelines Fruit	✓		1.902	1.902
Starch	✓		0.733	0.464
Vegetables	✓		-1.612	0.107
Lettuce-based salads	✓		1.361	0.173
Sweets / Candy	✓		-0.023	0.981
Junk			-1.826	0.068
Dairy		✓	2.784	0.005
Protein		✓	7.052	0.000
Bread & Cereals		✓	2.434	0.015
17. Meet physical activity guidelines	✓		-1.120	0.263
18. At risk of injury and homicidal violence	N/A	N/A	N/A	N/A
19. Use substances and drugs	N/A	N/A	N/A	N/A
20. Alcohol usage		✓	8.623	0.000
21. Uses tobacco	N/A	N/A	N/A	N/A

Table 29. U.S. students compared to HP2020 goals

Leading Health Indicator	Tx State	HP2020 Goal	Met
1. Access to Health Services Health Insurance Coverage	84%	100%	☹
Access to a primary care physician	57%	83.9%	☹
2. Access to RSH	17%	86.5%	☹
3. Mental Health Reduce the number of suicides	2 per 100K*	10.2 per 100K	✓
4. Decrease the Air Quality Index (AQI) Weighted People Days (WPD)	4.3 Billion**	6.8 Billion	✓
5. Nutrition, Physical Activity and Obesity Exercise for at least 150 minutes	34%	20%	✓
Reduction in the number of obese individuals with BMI>30	15%	30.5%	✓
6. Reduce injury related deaths and Violence	1 per newspaper reports None reported***	53.7 per 100K	✓
7. Alcohol and Substance Abuse Reduce excessive drinking	5%	25%	✓
Reduce binge drinking	N/A	24.2%	N/A
Marijuana/Weed/Bhangi	22%	N/A	N/A
Opioids (morphine, fentanyl, hydrocodone etc.)	2%	N/A	N/A
Reduce illicit drug usage	1%	9.2%	✓
8. Tobacco Smoking reduction in adults	11%	12%	✓

* Extrapolated based on news and reported data, not actual suicide collected from data samples

** Based on HP2020 Reported numbers

***Students indicated not at risk/no students from the sampling answered the question

VII. DISCUSSION

The America Medical Association (AMA) stated that countries can only be economically stable with healthy, productive citizens. Just as the health of people impact the economy of the nation, the economy of the nation can impact the health of its people. The U.S. spent upwards of $8.6K per person in 2010, which increased to about $11.7K in 2018. The current research was important since it compared health indicators from one of the highest spending nations to Kenya that strived to provide better health care services but spent only $66 per person in 2016.

When reviewing the first LHI, the comparison between health insurance coverage of the two nations was significantly different. The proportion of U.S. students with health insurance coverage was higher than Kenyan students. Perhaps the proportion of Kenyan students with health insurance will increase once individuals recognize the benefits of the program. Otherwise, access to medical treatment was similar between the two nations.

HP2020's goal for U.S. citizens was to increase health insurance coverage from 76.3% in 2007 to 83.9% in the year 2020. As of 2018, the numbers of U.S. citizens with health insurance coverage was 91.5%. (U.S. Census Bureau). The results from our survey indicated that 84% of U.S. students had some type of health care coverage. Of the U.S. students, 49% were covered under their parent's insurance policy. Once these students graduate and are employed, they will most likely be able to obtain their own insurance coverage through their employer. Others may qualify for expanded Medicaid depending upon their state of residence (Pennamon, 2018).

The second LHI examined RSH services. Results from the study showed 58% or 77 of the 132 U.S. female students were sexually active. Only 18 (23%) of these students

indicated that they used RSH services. However, a higher number (40) of students responded that they were using pharmaceutical products for birth control. Most individuals who were using a pharmaceutical birth control product must see a physician before they can acquire the product. Thus, it appeared that actually 30% of the female students as opposed to the 23% used the RSH services. However, this number was still lower than the HP2020 RSH goal of 86.5%. Research indicated that students on campus were not only sexually active but tended to have risky sexual behaviors that warranted the need for RSH services (Eisenberg, Garcia, Frerich, Lechner, & Lust, 2012). The Texas State University Student Health Center provides RSH services. However, this resource was under-utilized with only 11% of the U.S. students indicating they used the student health center, which was possibly because the students were using a primary care physician or gynecologist for these services.

The majority (82%) of the Kenyan students indicated they were sexually active. However, only 19% indicated they had access to RSH services though 22% were using pharmaceutical products. In reviewing the Kisii County Health Services website in Kenya, the strategic plan listed priorities such as reducing communicable diseases, injury, and violence. However, RSH services were not one of the major objectives (Omache, 2020).

This disparity highlighted the need to make students aware of the services provided at the student health centers. While Godia, Olenja, Hofman, and Van Den Broek (2014) suggested that healthcare organizations that offer RSH needed to target Kenyan students, apparently, both countries need to promote their health services as indicated by the similarities in the despairingly low results.

In order for students to be successful in their studies, they must be healthy mentally. The goal of the HP2020 LHI3 was to decrease the suicide rate from 11.3 to 10.2 per 100,000 people. Results from U.S. sample showed that 23 of the 142 students had attempted suicide. Harvard School of Public Health (2020) noted that 5-11% of those who attempt suicide eventually succeed. Based on Harvard's percentages, one to 2.5 of the U.S. students may eventually follow through. The suicide prevention resource center showed that college student's suicide rates were half of the general populations' suicide rates (Schwartz, 2006). Between 2016 and 2019, three U.S. students committed suicide (Bradshaw, 2016; Martinez, 2019; Rodriguez, 2019). When compared to HP2020, in extrapolating the number of students who committed suicide to the number of students at the Texas State University campus (1/38,000) per year, would be roughly equivalent to 3 per 100,000, which was less than the HP2020 goal of 10.2 per 100, 000.

Given that suicide was considered the eleventh leading cause of mortality in the U.S., it was also important to assess if the students knew where to get help when faced with suicidal thoughts or ideation. For the U.S. student sample, 95% knew where to seek help. The National Institute of Mental Health (NIMH) has a toll-free number which is manned 24 hours a day, 7 days a week and provides additional resources on its website. The Texas State University Counseling Center's website provides the NIMH toll free number and also provides a video that educates students on the symptoms of stress, suicidal tendencies, warning signs, and how they can help their fellow students who show suicidal signs.

Only one Kenyan student indicated attempting suicide while two students had suicidal thoughts. While this number seems a little low, the World Health Organization

(2018) reported to be least 6.5 suicides per 100,000 people. Kenya has laws against attempting suicide, which might be one reason for the low response rate. Chapter 63, Section 226 of the penal code states “Any person who attempts to kill himself is guilty of a misdemeanor” (Kenya Police, 2020). The hypothesis testing for suicides affirmed the differences between Kenya and U.S.

In 2008, 18.2% of adults met the current federal physical activity guidelines. The goal for the fifth LHI is to increase this number by 10% to 28.2%. Thirty-four percent of the U.S. students exercised at least 2 hours and 30 minutes each week, which is the amount recommended by USDA. Thus the U.S. students moderately surpassed the HP2020 goals by almost six percent. The general population also experienced an increase in physical activity to 24% by 2018. Since these students are bridging from adolescence to adulthood, it is an important time to begin lifelong behaviors such as dedication to physical activity.

Kenya is known for long-distance marathon runners but not every Kenyan is a runner. Forty percent of the Kenyan students met the USDA guidelines which is similar to the U.S. numbers. Recent economic prosperity in Kenya has led to a more sedentary lifestyle. According to Gichu et al. (2018) who used the Global Physical Activity Questionnaire (GPAQ) tool that was developed by the WHO, Kenyans outperform neighboring countries in physical inactivity. Recommendations suggest that Kenya must establish venues such as parks to increase physical activity.

The differences in physical activity between the U.S. and Kenya were minimal as evidenced by the failure to reject the null hypothesis. Kenya’s First Lady, Margaret Kenyatta, leads by example as she implored Kenyans and other nations to embrace

physical activity during her speech at a Geneva Convention in 2019. The First Lady participates in organized marathons in the hope of "walking the walk" and mobilizing the citizens into participation (Office of the First Lady of the Republic of Kenya, 2019). Similarly, U.S. Former First lady, Michelle Obama, started the "Let's Move" movement geared towards increasing better health habits and reducing childhood obesity (Michelle Obama, 2017).

The goal for the seventh LHI was to reduce the number of deaths caused by injuries from the baseline of 59.7 to 53.7 deaths per 100,000 people. Only one U.S. student was murdered in 2019 (Martinez, 2019). According to Bennett and Bates (2015), college students are more likely to be injured from sports or dating violence than murder. The National Center of Domestic and Sexual Violence (2007) found that 21% of college students experienced date violence by a current partner and 32% by a previous partner. None of the U.S. students in our sample indicated they had experienced relationship violence or injury. The results from the 2016-17 school year basically indicate that 0.2% of the university population experienced violent crimes against themselves. Thus, the 167 students within our cohort could be part of the 99.8% that did not experience violence. The violence reported by the students at the U.S. campus were lower than the numbers reported by the National Center of Domestic and Sexual Violence (2007), indicated that roughly 21% of college students experienced date violence by a current partner or 32% by a pervious partner. Oswalt, Wyatt, and Ochoa (2018) noted that relationship violence is prevalent in colleges in the form of emotional abuse, physical abuse and stalking rather than in actual sexual assault.

Roughly a quarter (23%) of the Kenyan students indicated they were at risk for relationship violence. Only five students were worried about being injured and four felt threatened with the possibility of being murdered. These responses reflect a prevalence of relationship violence in Kenya, which is commonly directed towards women. The United Nations Women (2020) explored violence against women and found 40.7% of women in Kenya experienced relationship violence at least once in their lifetime.

As per the seventh LHI, the goal is to reduce alcohol abuse from 24.2% to 14.2%. However, the question we asked pertained to number of drinks per month rather than binge drinking. Roughly two thirds (65%) of the U.S. students indicated using alcohol, which is ten percent higher than the 53% average across all U.S. college campuses as noted by National Institute on Alcohol Abuse and Alcoholism (2015).

For the Kenyan students, 9% responded that they were consuming alcohol. Comparing these results to the NACADA (2019) findings that stated 2.6% of Kenyan students consumed alcohol, the sample results were almost three times higher. The results of the hypothesis testing affirmed a significant difference between the proportion of U.S. and Kenyan students who were drinking alcohol. Therefore, the alternative hypothesis was accepted. Alcohol usage by college students is depicted in the media as prevalent especially with excessive drinking in fraternities. Some colleges have set up measures to educate students about responsible drinking habits. One such example is the program at Indiana University known as the Alcohol Skills Training Program (ASTP) which offers advice for healthy alcohol consumption (Andreano, Ford, Karwoski, & Wilson, 2018).

VIII. CONCLUSION

One goal for this research was to compare health indicators between students in two nations. While some of the indicators were different, others were similar. The findings indicate that in certain areas, both nations lack adequate support for their students. Access to health insurance was above average in the U.S. However, until Kenyans including students adopt the NHIF, the low proportion of students with insurance indicates opportunity to increase insurance coverage. One initiative Kenya has undertaken was to remove the co-pay for visits to government clinics. College students tend to participate in more risky sexual behaviors that expose them to STD's and HIV. At least 75% of the Kenyan students were use condoms to protect themselves, which was higher than the proportion of U.S. students that were using condoms. These results may help colleges and universities to provide services for health indicators where the students did poorly such as nutrition, access to RSH, and alcohol, drug, and substance abuse. Our reason for comparing these populations was to determine disparities between nations with significantly different health care expenditures per capita. Evidence demonstrated that access to health services was different such as shown in the disproportioned percentage of students with insurance and access to primary care providers.

Another goal was to compare U.S. students to the HP2020 LHI metrics. While the student sample did not meet two goals including access to health services and access to RSH, the goals were met for five of the LHIs. Thus, while the students did not have access to health services at the targeted metrics, they were healthy in general. When asked about the status of their health, roughly 80% of the students indicated that they were in good to excellent health.

Limitations

Students did not respond to several questions. For example, the U.S. students did not respond to the questions about injuries or violence. Unless the U.S. students have experienced violence themselves, they may not be aware of things occurring around them. While some of the U.S. students indicated that they had used certain drugs and substances, none of the Kenyan students responded to this question. Additional research is needed to determine if students felt threatened that legal actions would be taken against them. A suggestion to combat the lack of or no response is to redesign the questions about drug abuse, violence, and suicide in order to get a better response rate. Another limitation was that the questions about alcohol abuse did not identify binge drinkers.

Future Research

Future research should concentrate on those areas where one of the student groups responded negatively as well as areas that the students did not respond at all. For example, Kenyans did not respond adequately to the questions on suicide, substance abuse and weight. Kenyans might be charged with a misdemeanor if they responded that they had attempted suicide. Thus, collecting the responses in a more private or completely anonymous manner might increase the students' responses for questions regarding drug abuse, violence, and suicide in the future. Since students wished to be entered into a drawing for a t-shirt, the survey wasn't completely anonymous as they had to provide their e-mail addresses for the drawing. For the U.S. students, they did not respond to questions about relationship violence, injury, or risk of homicide. Future research should explore whether the Clery Act requirements to report crime increases

U.S. students' awareness of potential risks of being harmed. Future research should explore whether differences exist between additional nations.

When students were asked if they had access to RSH, the question had focused on prenatal and antenatal services which not only excluded the male participants, but also may have excluded those students who did not assume that they should have responded if they had received well woman checkup or birth control counseling. In fact, more of the students were using pharmaceutical birth control indicating they had access to RSH than responded positively to the question. Future research needs to ensure that this and other questions are designed to better reflect the LHIs.

APPENDIX SECTION

HP 2020 Leading Health Indicators Qualtrics Survey

Healthy People 2020 Thesis

Violet Kiragu, a graduate student at Texas State University, is conducting a research study to complete her thesis comparing the availability of health as well as health conditions in different nations. You are being asked to complete this survey because you are a student at Texas State University.

Participation is voluntary. The survey will take approximately 15 minutes or less to complete. You must be at least 18 years old to take this survey.

This study involves no foreseeable serious risks since we will keep your response anonymous. We ask that you try to answer all questions; however, if there are any items that make you uncomfortable or that you would prefer to skip, please proceed to the next question. Your responses are anonymous or confidential.

Possible benefits from this study are a better understanding of access to health care and health conditions in different populations.

Reasonable efforts will be made to keep the personal information in your research record private and confidential. No identifiable information will be collected with the survey. Any identifiable information obtained in connection with the drawing for the t-shirt will remain confidential and will be disclosed only with your

permission or as required by law. The members of the research team and the Texas State University Office of Research Compliance (ORC) may access the data. The ORC monitors research studies to protect the rights and welfare of research participants.

Your name will not be used in any written reports or publications which result from this research, (remove this sentence if not applicable to your study). Data will be kept for three years (per federal regulations) after the study is completed and then destroyed.

After you finish answering the questions you are comfortable in completing, you can enter your name into a drawing for a chance to win one of two Texas State University t-shirts. The winners will be selected randomly from those who complete the survey and provide their contact information in the second survey. Note the data collected for the drawing will not be tied to your answers on the first survey.

If you have any questions or concerns, feel free to contact [Applicant name] or his faculty advisor (if applicable):

Applicant Name, Violet Kiragu - vm1026@txstate.edu

Thesis Chair: Barbara Hewitt
Professor Health Information Management
(512) 245-3502
barbarah@txstate.edu

And other committee members:

Joseph Topinka, JD Health Administration
josephtopinka@txstate.edu (512) 245-9079

Alex Mcleod, Ph.D.
Health Information Management am@txstate.edu
(512) 245-8242

This project 6629 was approved by the Texas State IRB on [insert IRB approval date or date of Exemption]. Pertinent questions or concerns about the research, research participants' rights, and/or research-related injuries to participants should be directed to the IRB chair, Dr. Denise Gobert 512-716-2652 – (dgobert@txstate.edu) or to Monica Gonzales, IRB Regulatory Manager 512-245-2334 - (meg201@txstate.edu).

If you would prefer not to participate, please do not fill out a survey.
If you consent to participate, please complete the survey.

1. Do you consent (agree) to start the study?

   Yes

   No

2. Age / How old are you?

3. What is your Citizenship?

   United States of America

   Kenya

   Other

4. Major

5. Sex

   Male

   Female

   Prefer not to answer

6. Have you received reproductive health services (such as Prenatal/Antenatal) in the past 12 months?

   Yes

   No

   Not Applicable

7. Are you sexually active?

Yes

No

Prefer not to say

8. If you are sexually active, how do you protect yourself/your partner from pregnancy? (Remember that pulling out prior to ejaculation is not a form of birth control nor does it prevent sexually transmitted diseases)

	Pregnancy	Sexually transmitted diseases
Condom		
Diaphragm, or another IUD device		
The pill, patch, or other pharmaceutical product		
None		
Other		

9. Do you have children?

Yes

No

Prefer not to answer

10. What are your children age ranges?

Newborn - 5 Years

6 Years - 12 Years

13 Years and above

Total

11. Do you have any support systems mentioned below to help with?

	Rearing/raising children	Taking classes	Both	Neither
Family Member				
Children are in boarding				
School Children are in Public school				

Daycare Children				
Counseling				
Parenting Mentorship				
Programs Other				

12. Which of the following locations do you seek regular treatment at?

    Primary care physician

    Student Health Center

    Outpatient Clinic

    Emergency room

    Other

13. When is the last time you sought treatment?

    Within the last month

    Within the last three months

    Within the last six months

    Within the last year

    Within the last two years

    Over 2 years

14. When you need to seek treatment, how long does it normally take you to get an appointment?

    Within 1 day

    Within a week

    Within 2 weeks

    Within a month

    Within2months

    Within 6 months

    Within a year Other

15. What Health Insurance do you have?

    Public Health Insurance (USA - Obama Care), (Kenya-NHIF) etc.

Parent's insurance plan

Private insurance purchased through employer or workplace

Private insurance purchased directly from insurance company

The military, Tricare, or the VA

Medicaid, Medicare

The Indian Health Service

No health insurance of any kind

Cash

Other (please specify)

16. In general, how would you rate your overall health

Excellent

Very good

Good

Fair

Poor

Don't know/not sure

Don't wish to share

17. Chronic conditions (please check all that apply)

High blood pressure Diabetes

Asthma HIV/AIDS

Sexually transmitted disease Tuberculosis

Cancer

Other (please specify)

18. Are you up to date with your immunization?

Yes

No

19. Have you visited a dentist in the past 12 months?

Yes

No

20. Do you smoke?

Yes

No

21. How much do you smoke per day?

1 to 2 cigarettes a day

3 to 5 cigarettes a day

6 to half a pack of cigarettes

Over half a pack to a pack per day

Over a pack per day

22. Are you trying to quit smoking?

Yes

No

23. Are you exposed to secondhand smoke? Secondhand smoke is being exposed to smoke when another person is smoking.

Bars

Restaurants

At home

At a friend

At work

Other

24. In the past month, how many times have you used the following?

Alcohol (1-4 drinks)

Alcohol (5 + drinks in one day)

Marijuana/Weed/Bhangi

Opioids (morphine, fentanyl, hydrocodone etc.)

Illicit drugs (heroin, cocaine, ecstasy)

25. Do you believe you are addicted to?

Alcohol Marijuana

Opioids

Illicit drugs

26. Have you ever contemplated suicide?

Yes, and attempted it

Yes, often but never attempted it **Yes, once or twice**

No

Choose not to answer

27. Do you know where to get help if someone is contemplating suicide?

Yes, I know who to contact or how to find the suicide hotline number

No, I do not know

28. Have you experienced any major episodes of depression in the last 12 months?

Yes

No

Maybe

29. Are you currently feeling stressed?

Yes

No

Maybe

30. Do you have access to programs that prevent or reduce stress?

Yes

No

31. Please indicate the number of servings of the following food categories you eat on an average day. Unless specified, a serving is a half-cup or small handful.

Food Group	Entry
Fruit (Banana, Orange, Apple, Mango, glass of fruit juice, Guava, handful of grapes)	
Starch (e.g. baked, mashed, or fried potato, Handful-sized amount of ugali, or a handful of fries/chips)	
Vegetables (not including potatoes)	
Lettuce-based salads	
Dairy servings (Milk, yogurt, ice cream, or cheese)	
Protein - Meats or other proteins (hamburger, fish, chicken, etc.)	
Breads, cereals, and other grain products	

Candy, cookies, other sweet products	
Chips/Crisps and other unhealthy snacks (junk food)	

32. How many times a week do you exercise in a typical week?

Zero

1 day per week

2 days per week

3 days per week

4 days per week

5 days per week

6 days per week

7 days per week

33. How many minutes do you exercise on average per day?

Minutes

34. Some people do not exercise. If you choose not to exercise, please indicate why you don't exercise?

Medical

My work is physical

Don't have time

Other

35. Health data - Please enter if known

Weight

Height (feet)

Height (inches)

Blood Pressure High

Blood pressure low

36. Do you have concerns with your air quality?

Yes, there is current air pollution issues

No, there are no current air pollution issues

Not aware

37. What illnesses are of concern to you from air pollution?

    Asthma

    Breathing issues

    Other

38. Are you at risk of relationship violence, injury, death or homicide?

    Injury

    Physical harm that can lead to death

    Homicidal violence

39. Do you wish to participate in the drawing for a Texas State University t-shirt?

    Yes

    No

40. In our invitation for your participation, we offered to enter you into a drawing for a t-shirt. Please provide your name and address so that we can mail your t-shirt if you are selected. This information will only be used to identify the winners and is not in any way tied to your responses in the survey.

    Name

    Address

    City State Postal code Country

    Email address

    T-shirt size

Thank you for your time and cooperation. We appreciate your time and effort on this project. Remember if you have any questions or concerns, you may contact any of the researchers:

1. Violet Kiragu - vm1026@txstate.edu
2. Thesis Chair: Barbara Hewitt - Professor Health Information Management

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3. Joseph Topinka, JD Health Administration

   (512) 245-9079 josephtopinka@txstate.edu
4. Alex Mcleod, Ph.D. Health Information Management

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