

A Formative Evaluation of Healthy Habits, Healthy U: A Collaborative School-Based Cancer Education Program

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ABSTRACT

PURPOSE: *Healthy Habits, Healthy U (HHU) is a two-day school-based primary prevention cancer education program that uses interactive classroom presentations designed to help students learn how to reduce their cancer risks. HHHU is a collaboration between a local cancer hospital, school district and university. HHHU incorporates real cancerous and non-cancerous specimens to help students see cancer's impact on the body. The purpose of this formative evaluation was to revise the program based on feedback from the students, teachers, facilitators and research assistants. METHODS:* Two studies, fall and spring, were conducted to assess the efficacy of the HHHU junior high cancer prevention program. Eight hundred thirteen students participated in Study 1 and eight hundred twenty participated in Study 2. **RESULTS:** *The results indicated that students learned how lifestyle choices affect the body, what cancer is and how it develops. Students could identify three of their unhealthy habits that might increase their risk for cancer as well as how they could make changes to these unhealthy habits in the next 30 days to decrease their risk of cancer. Feedback from students, teachers and the HHHU team was used to make program improvements for Study 2. CONCLUSIONS:* The results of Study 1 and Study 2 suggest that students' knowledge of cancer, how cancer develops, and ways everyday lifestyle choices affect the risk of developing cancer have improved following program implementation. Incorporating participant feedback improved program delivery and student worksheets. **RECOMMENDATIONS:** Ask students to create a plan to improve an unhealthy habit and conduct a follow-up with students at the end of the semester. Continue to refine the program and expand to additional urban and rural schools. Add an elementary school version of the program.

KEYWORDS: *School-based, Cancer, Prevention, Health Education*

INTRODUCTION

According to the American Cancer Society (ACS), an estimated 1,685,210 new cancer cases will be diagnosed and 595,690 people will lose their lives to cancer in 2016 (ACS, 2016). Although there are many factors that contribute to cancer, 90–95% of cancer cases have their roots in exposure to environmental toxins and unhealthy lifestyle choices. Thus, the majority of cancer cases are preventable (Preetha, et al., 2008). For example, a number of studies (Pollack, Nomura, Heilbrun, Stemmermann, & Green, 1984) have revealed that chronic alcohol consumption is a risk factor for mouth, pharynx, larynx, and esophagus cancers. Epidemiological studies (Stewart & Wild, 2014) have linked the use of cigarettes and smokeless tobacco products to 14 different types of cancer. Poor diet, specifically consumption of red meat, increases the risk of developing colorectal cancer (Stewart & Wild, 2014). In addition, frequent consumption of sugar-sweetened beverages increases the risk of pancreatic cancer (Schernhammer, et al., 2005). Finally, getting a severe sunburn as a child or adult, can increase the risk of melanoma skin cancer (ACS, 2015).

Just as poor lifestyle choices are linked to increased risk of developing cancer, healthy lifestyle choices have been linked to cancer prevention. For example, increased physical activity can lower the risk of colon cancer and colorectal cancer (Chao, et al., 2004). In addition, a diet high in fruits and vegetables decreases the risk of getting many different types of cancer (Stewart & Wild, 2014).

Early education about these risky lifestyle choices could increase awareness of the effects daily choices have on the body, provide positive alternatives to lower the risk of developing cancer, and serve as a primary cancer prevention program (The Association of Faculties of Medicine of Canada, 2015). Some regions of the United States already include these types of programs within the public school health curriculum – these programs will be discussed below (Stölzel, 2014; Villalobos, Quintana & Ribeiro, 2012; Plattner, et al., 2014). However, these programs can be rather extensive, may lack certain important topics in cancer prevention, and often do not assess the intentions of students. Other educational

programs have been successful at improving students' behavioral intent to adopt positive health habits in the short-term (Ickes & Sharma, 2012; Ottawa, Sposato, Nabbouh, & Saposnik, 2015; Simon et al., 2004). There is a need for a brief, efficient, cost-effective primary cancer prevention program implemented within schools to provide complete knowledge about healthy lifestyle choices and advocate forming healthy habits earlier in life. Creating positive lifestyle choices at a young age is fundamental to reducing the risk of developing cancer (Centers for Disease Control and Prevention [CDC], 2011).

Current school-based primary cancer prevention programs like Be Smart Against Cancer (Stölzel, et al., 2014), Cure4kids (Villalobos, Quintana & Ribeiro, 2012), and Healthy Children Arizona: Early Intervention for Prevention (Plattner, et al., 2014) have been successful in educating students about some of these lifestyle choices, as well as what cancer is and how it develops. These programs collectively include education on lifestyle topics of drugs, alcohol, tobacco, exercise, nutrition, sugar-sweetened beverages, and sun exposure protection to increase knowledge and promote primary prevention strategies, but none include all of these health topics. Be Smart Against Cancer (BSAC) discussed many of the long-term effects of unhealthy lifestyle choices, but it is a 5-day program; the length of the program makes it undesirable for some school systems as they would like a more condensed intervention so as to minimize disruption of normal classroom activities (Stölzel, et al., 2014). Cure4Kids explains what cancer is, but does not focus on intention to improve lifestyle choices (Villalobos, Quintana & Ribeiro, 2012). Healthy Children Arizona: Early Intervention for Prevention discusses healthy eating habits, physical activity, and sun exposure, but does not cover tobacco use and sugar-sweetened beverages (Plattner, et al. 2014). Thus, there is a need to create a program, taking the strengths of previous programs and including the topics that were minimized or excluded to provide efficient, cost-effective cancer prevention education that can be administered in a short period of time.

Healthy Habits, Healthy U (HHHU) is a collaborative effort among Boise State University (BSU), St. Luke's Mountain States Tumor

Institute (MSTI), and the Boise School District (BSD). Through effective collaboration, these three institutions developed a primary prevention program that provides a classroom presentation designed to help reduce cancer risks in Idaho through school-based education about lifestyle choices (nutrition, physical activity, tobacco usage, sun safety, and sugar-sweetened beverages) and their connection to cancer. Primary prevention aims to stop the onset of disease through behavior change, education about risk factors, and the promotion of healthy behaviors (The Association of Faculties of Medicine of Canada, 2015). HHHU differs from the previously described cancer programs because it aims to not only educate students on healthy and unhealthy behaviors that lead to cancer, but also physically shows each student what non-cancerous and cancerous organs look like. The visual is a good compliment to what they are learning about positive health habits because the student can see how health habits impact organ function. We felt it was important to add this hands-on learning aspect to our cancer prevention program as: 1) students report liking hands-on learning better than other methods when learning about health habits (Wise, 2015), and 2) studies suggest that hands-on learning is effective for promoting effective health behaviors changes (Hong, Bales, & Wallinga, 2017). HHHU has also incorporated intention-based education by having students identify two habits they could begin or continue to do to reduce their risks of cancer. This provides a means to assess and affirm their understanding and intentions for future lifestyle choices.

PURPOSE

The primary purpose of this project was to conduct a formative evaluation of the Healthy Habits, Healthy U (HHHU) eight grade program and determine any necessary programmatic changes. The curriculum was co-developed by the local cancer hospital's cancer educator, university faculty, and the public-school health teachers. To meet the limitations of the school district health curriculum, HHHU was structure to align with Common Core learning outcomes and could only be two periods long. It was important to have the lesson follow school district's curriculum guidelines and easily integrate with other health topics. This paper reports on the initial junior high implementation and formative

evaluation conducted during the 2014-2015 academic year.

STUDY 1

METHODS

Healthy Habits, Healthy U was implemented in all eight of the school district's junior high health classes because this is the first time students are required to take P.E. and health. All 8th-grade students enrolled in a health class received the HHHU program during the Fall 2014 semester. The two lessons were each formatted for the standard 47-minute class period. School districts supplied demographic data for the 2014 school year.

Participants

A total of 813 students enrolled in 8th-grade health classes within the eight junior high schools and their teachers participated in this formative evaluation. They were predominantly English-speaking. School district supplied demographic data for the 2014-2015 school year indicated students were 48% female, 52% male. The students were 78% Caucasian, 10% Hispanic, 4% Asian, 4% Black, 2.5% mixed race, and the remainder were American Indian/Pacific Islander.

Instrumentation.

The worksheet was developed in conjunction with two junior high health teachers, with over 15 years of experience each, and the HHHU team. The two-sided worksheet included an organ identification section created by the HHHU team (Appendix A). The health teachers created side two based on the Common Core learning outcomes used by the school district. These outcomes have students summarize, connect, and reflect on how each health topic applies to them personally. The two teachers reviewed the worksheet for reading level and understanding.

The following describes the worksheet. After viewing samples of cancerous and non-cancerous organs, students were first asked to correctly identify which organs were cancerous and which were non-cancerous and how the tissue samples differed in appearance. Students were then asked three open-ended questions based on what they learned from the HHHU program. The first question asked for a summary about what was learned about the organs and

describe how they are affected by cancer. The second question asked students to connect what health practices can help reduce the risk of developing cancer. The third question asked students to reflect and identify two habits they could continue to do or begin to do to reduce the risk of developing cancer.

A scoring rubric for the worksheets was created and piloted in the fall semester. A sampling of completed worksheets were reviewed by the HHHU research team and scoring categories were created. The categories are relatively broad to capture breadth of answers that were given. For example, answers that were inaccurate or incomplete were scored a 1 to give credit for attempting to answer the question, versus the student who did not answer the question. During rubric development it was decided that a single response with a description was equal to a simple listing 2 or more key points. The rubric is described below and included in Appendix B.

On the organ identification side, students' responses were scored based on the number of accurate descriptions they provided for each tissue sample (*0=no answer, 1=inaccurate or incomplete answer, 2=1 accurate description, 3=2 or more accurate descriptions*). Each worksheet was also scored according to the percentage of organs correctly identified. On side-two students' responses were scored based on the quality of descriptions provided for each open-ended question (*0=no answer, 1=inaccurate or incomplete answer or 1 key point with no description, 2=2 or more key points or 1 key point with a specific description, 3=2 or more key points with at least 2 specific descriptions*). Additionally, the answers were categorized according to various health topics covered by the program. Topics included drug use, tobacco, nutrition, physical activity, sunscreen, sugar-sweetened beverages, information about the organs, and general facts the participants learned about cancer (Appendix B).

Procedure

The HHHU program was taught over two consecutive days. The program was developed to allow the teachers to instruct the first day of the program and the HHHU team to teach the second day. On Day 1, an age-appropriate video was shown to students followed by a class

discussion about cancer. Students were divided into small groups and each group received articles pertaining to health habits and cancer risks. The article topics included physical activity, nutrition, and sugar-sweetened beverage consumption. Each group made a poster about what they learned and reported out to classmates. The content of the posters were not analyzed because not all were collected and the posters varied from solely text-based to strictly graphic.

Trained HHHU staff and assistants taught the Day 2 lesson plan. After reviewing the information provided on Day 1, students were given two human tissue samples (cancerous and non-cancerous) and were provided with a worksheet to record their observations. On the back, students were asked to summarize, connect and reflect on what they learned about the organs and how they were affected by cancer, and connect health practices to reducing cancer risks. Finally, each student was asked to identify two habits they could continue to do or begin to do in order to reduce their cancer risks.

Data Analysis

All worksheets were checked for missing data. Data was coded and entered by teams of two research assistants into Statistical Package for the Social Sciences (SPSS) version 22. If a student chose not to answer a question then the item was scored a "0". Worksheets were checked for completion as they were turned in. All worksheets were scored and included in the analysis. The worksheets were completed by students who were in class for the Day 2 session. As data was entered and checked by at least two research assistants, no interrater reliability coefficients were calculated.

INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL

This research was approved by the Institutional Review Board (protocol # 103-SB16-20).

INFORMED CONSENT

Parents and their students were informed about the Healthy Habits, Healthy U program and could choose to participate. The health teachers also gave informed consent to be interviewed.

RESULTS

Overall, students could correctly identify which organs were cancerous and non-cancerous (97.87% correct). Students were asked to summarize what they learned about the organs and how they are affected by cancer. Students correctly identified one key point concerning what they learned about the organs and how they are affected by cancer ($M=1.85$, $SD=.64$). Students were then asked to reflect on what health practices can help reduce the risk of developing cancer. Students could identify 2 or more key points or 1 key point with a specific description ($M=2.12$, $SD=.54$). Finally, students were asked to identify two health habits they could continue to do or to begin in order to reduce their risk of developing cancer. Students could list 2 or more health habits or they could identify 1 health habit with a specific description of how they would implement it ($M=2.19$, $SD=.62$).

HHU covers a variety of topics: drug use, tobacco, nutrition, physical activity, sunscreen, sugar-sweetened beverages, how cancer impacts organ function, and general cancer facts. The answers to the open-ended questions were identified and categorized according to the health topics discussed in class. Most students mentioned nutrition (96.2%) and physical activity (91.5%). In addition, 76.9% discussed cancerous organs, and 67% mentioned cancer. Other risk factors mentioned included 36.3% sugar-sweetened beverages, 28.7% tobacco, 17.3% drug use, and 4.3% sunscreen use.

DISCUSSION

The purpose of this study was to conduct a formative evaluation of a newly created interactive two-day primary cancer prevention program for junior-high health classes. The intention of the program was to create and deliver a cancer-prevention program that included multiple learning style components. This combination of activities, lecture, article review and synthesis, videos and human tissue examination was structured to educate students on the importance of adopting healthy lifestyles that could decrease their risk of developing cancer. Overall, students were accurate when differentiating between cancerous and non-cancerous organs. However, researchers noticed that the organ identification worksheet

could be improved. Thus, the worksheet was modified for Study 2 and students were provided specific prompts to use when describing the differences between the cancerous and non-cancerous organs. Researchers also discovered when coding student responses that students were not truly reflecting on what they learned; rather they were listing topics that were covered by the HHHU program. The completed worksheets were reviewed by the HHHU teaching team to determine what topic areas students were scoring 1 or below in so those areas could be reinforced in the next round of teaching. The student worksheet was further modified in Study 2 to address these concerns. The worksheet was then redesigned for Study 2 to allow students to not only summarize what they learned, but also state how they would incorporate the information into their daily lives. The instructors also focused the content to address the areas where students scored the lowest.

STUDY 2

The HHHU team used the formative evaluation from Study 1 to make programmatic improvements to both the curriculum and worksheets. Some of the changes included increasing the number and variety of tissue samples. Initially, there was one set of organs consisting of the liver, kidney, and colon. Based on feedback from the HHHU staff and teachers, pathology was asked to procure more tissue samples. This allowed students to have more time to examine the different organs, work in smaller groups, and see a greater variety of tissue samples. At the start of Study 2, there were eight sets of organs consisting of the liver, kidney, colon, and lung. In addition, on Day 1, teachers were encouraged to discuss other factors that increase cancer risk besides poor nutrition and lack of physical activity, such as sunscreen and tobacco use. A topic checklist for both lesson plans were created and used for each class to ensure the consistency of each presentation. The teaching assistant training was modified to include a session with the hospital pathologist. The doctor discussed cancer, treatment options and explained the tissue samples to all of TAs so they were better prepared for student questions. Each TA observed 4 classes before co-teaching an 8th grade class.

METHODS

After the modifications were made, the Healthy Habits, Healthy U curriculum was implemented in the spring 2015 8th-grade health classes. Junior high students who take health in the fall take PE in the spring and vice-versa. Thus, the spring classes had different students from the fall classes.

Participants

Participants in this study were 8th-grade students enrolled in a health class during the spring 2015 semester in local school district. Overall, 820 8th-grade health students participated in the program. School-district-supplied demographic information indicated students in these schools were approximately 48% female and 78% Caucasian, with 10% Hispanic, 4% Asian, 4% Black, 2.5% mixed race, and the remainder American Indian/Pacific Islander.

Instrumentation

Students were asked to complete a two-sided worksheet (Appendix C). After viewing the tissue samples, students recorded their observations and identified which organs were cancerous and which were non-cancerous and how the tissue samples differed in color, text, size, and function. On side two, the first question asked for a summary of what was learned from the HHHU presentation (video, articles, and presentations). The second question asked them to identify current health habits and health habits they intended to start in the next 30 days that could reduce their risk for developing cancer.

The scoring rubric for the organ identification worksheet was the same as in Study 1. The only difference was now the students viewed four tissue samples, with the addition of lung, versus three in Study 1. Responses were scored based the descriptions provided for each tissue sample (*0=no answer, 1= inaccurate or incomplete answer, 2=1 accurate description, 3=2 or more accurate descriptions*). Each worksheet was also scored according to the percentage of organs correctly identified. On side two, responses to the first question were scored based on the number of and quality of descriptions provided (*Quantity: 0=no answer, 1=inaccurate or incomplete answer or 1 key point with no description, 2=2 or more key points or 1 key point with a specific description, 3=2 or*

more key points with at least 2 specific descriptions; Quality: 0=no answer, 1=incomplete or vague, 2=some description, 3=detailed and specific). Responses to question two were scored based on the number of unique and correct "current health habits" and "future health habits." For example, responses that mentioned eating healthy, eating snacks, and physical activity would receive a 67% vs. physical activity, eating healthy, and sunscreen would receive a 100%. This is because eating healthy and eating snacks both referred to food. Additionally, the answers were categorized according to various health topics covered by the program. Topics included drug use, tobacco, nutrition, physical activity, sunscreen, sugar-sweetened beverages, information about the organs, and general facts the participants learned about cancer (Appendix D).

Procedure

The overall program implementation was similar to the Study 1, with the exception of the lesson plan, checklists, additional TA training and updates to the worksheet used to collect student responses (described in Instrumentation).

Data Analysis

All worksheets were checked for missing data. Data was coded and entered by teams of two research assistants into Statistical Package for the Social Sciences (SPSS) version 22. Missing data was scored as a "0." As data was entered and checked by at least two research assistants, no interrater reliability coefficients were calculated.

INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL

This research was approved by the Institutional Review Board (protocol #103-SB16-20).

INFORMED CONSENT

Parents and their students were informed about the Healthy Habits, Healthy U program and could chose to participate.

RESULTS

Overall, students were able to correctly identify which organs were cancerous and non-

cancerous (93.13% correct). Students were asked to summarize what they learned about the HHHU program. Students correctly identified one key point concerning what they learned about how healthy habits influence the risk of developing cancer ($M=2.03$, $SD=.73$). However, the quality of their responses was relatively low ($M=1.62$, $SD=.74$). Students were able to identify current health habits 71.06% of the time. They were also able to identify ways to ways to improve those health habits within the next 30 days 75.48%. Similar to Study 1, researchers coded for how many students identified each topic covered by the program in both questions. Nutrition and physical activity remained the main risk factors discussed during the program implementation. Therefore it is not surprising that most students mentioned nutrition (83.1%) and physical activity (75.6%) as ways to reduce cancer risks. Additional risk factors mentioned included sugar-sweetened beverages (72.8%), sunscreen use (24.3%), tobacco use (15.7%), and drug/alcohol use (13.2%). The program used preserved human tissue samples as a way to broach the topic of cancer; thus, students also included cancer (78.7%) and cancerous organs (42.9%) in their answers.

DISCUSSION

The purpose of study 2 was to improve upon the strengths of Study 1 and to refine this school-based cancer education program. As a result, the modified worksheet better assessed what the students learned from HHHU, including how lifestyle choices affect the body, what cancer is and how it develops. Finally, students were asked to identify three current health habits and three health habits they could start in the next 30 days to reduce their risk of developing cancer. Upon further review of this modification, it became apparent that the students were not identifying their current unhealthy habits and corresponding positive changes to those habits as a means of reducing their cancer risks. An additional change was made to the oral and written instructions to address this gap.

One strength of HHHU is that the curriculum and worksheet are based upon currently utilized school-based programs and builds upon what was already developed. For example, BSAC introduced the lifestyle topics, also used in HHHU, and related this knowledge to behavioral intent (Stölzel, et al., 2014). Cure4Kids included

education about what cancer is and how it develops along with healthy living (Villalobos, Quintana & Ribeiro, 2012). According to the data collected in the last six years, there have been zero negative comments about the Cure4Kids program (Villalobos, Quintana & Ribeiro, 2012). Healthy Children Arizona has reached approximately 20,000 primary age (5-8 years old) school children in the Tucson and Phoenix metro area since 2006 and is continuing to grow (Plattner, et al., 2014). Using these ideas as building blocks helped HHHU develop its initial program.

HHHU similar to other school-based cancer-prevention programs however, it differs with the incorporation of the examination of cancerous and non-cancerous human tissue samples. This activity allows students to observe how poor health habits can negatively affect the body. The students are encouraged to think critically about their current health habits and how negative habits may increase their risk of developing cancer. This is unique because previous programs have not included this specific type of hands-on activity in their curriculums.

CONCLUSIONS

The purpose of Study 1 and Study 2 were to conduct formative evaluations of HHHU to improve program implementation. Based on the results of the two studies, modifications were made to the curriculum and worksheet. The program seems to influence students' knowledge, which is the intended outcome of the program. The results of Study 1 and Study 2 suggest that students' knowledge of cancer, how cancer develops, and ways everyday lifestyle choices affect their risk of developing cancer improved. Specifically, Study 1 and Study 2 indicate that the 8th graders can correctly identify which organs are cancerous and non-cancerous. The students in Study 1 could identify, on average, one key point regarding what they learned about the organs and how they are affected by cancer. Study 2 results showed that they could identify multiple health habits that would reduce their risk of developing cancer. In identifying the topics discussed in the HHHU program, most students recognized nutrition and physical exercise as key components of reducing their cancer risks. Study 2 asked students to reflect on changes they could make to their current health habits in

the next 30 days, but did not ask the students to describe how the proposed habit change would be put into action. Future studies should ask students to select one of their unhealthy habits and provide specific steps they would take to implement the healthy replacement habit. Writing out the steps could allow students to think through the behavior change process.

Healthy Habits, Healthy U (HHU) is a unique curriculum because it includes cancerous and non-cancerous human organs for the students to observe. This allows the opportunity to make connections between everyday lifestyle choices and how lifestyle choices can affect a person's potential risk for developing cancer. It is also different from other programs in that it combines and builds upon successful implementation and assessment techniques used in previous primary cancer prevention programs. HHHU is a community-based program and serves the purpose of an encompassing effort to provide knowledge of risky lifestyle choices and offer healthy substitutes at an early age to encourage healthy habits and reduce one's risk of developing cancer. Along with the benefits of HHHU, this program also has its limitations.

LIMITATIONS

The HHHU curriculum was only evaluated in the 8th-grade health classes within a single school district, limiting the generalizability of the results. Cross contamination may have occurred in Study 2 when previous students of Study 1, the semester prior, had gone through the curriculum and discussed topics with their classmates.

RECOMMENDATIONS

A larger study including rural schools and other regions would allow more representative generalizability and reduce cross contamination. An outcome assessment with a control group should also be conducted to assess the effectiveness of HHHU compared to the existing junior high health curriculum provided in. Future studies could include a paper and pencil pre-test and posttest survey that utilizes either multiple choice or Likert-scale questions to reduce open-ended questions. Future evaluation projects could ask students to select one of their unhealthy habits and provide specific steps they

would take to implement the healthy replacement habit. Writing out the steps could allow students to think through the change process. An end of the semester questionnaire could ask the students to report on how well they followed through with their behavior change intentions. Follow up studies are being conducted to address these issues. Lastly, evaluation results and stakeholder feedback be used to improve the teachers and teaching assistants training and program implementation.

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Appendix A

Healthy Habits, Healthy U 8th Grade Worksheet

Student Name _____ Teacher Name _____

Directions: **Look** at each pair of organs and write down the name of the organ in column #1. **Decide** which organ looks healthy or diseased and write down the number of the organ in column #2. **Describe** the differences you see between the healthy and diseased organs in column #3.

| #1 | #2 | #3 |
|---------------|---|--|
| Name of Organ | Healthy or Diseased? | How are the healthy and diseased organs different? |
| | Organ # ____ is healthy Organ # ____ is diseased | |
| | Organ # ____ is healthy Organ # ____ is diseased | |
| | Organ # ____ is healthy Organ # ____ is diseased | |
| | Organ # ____ is healthy Organ # ____ is diseased | |

✓ We also discussed how healthy habits include eating fruits and vegetables and being physically active.

1. **Summarize:** In a few sentences, summarize what you have learned about the organs and how they are affected by cancer.

2. **Connect:** What health practices can help reduce the risk of developing cancer?

3. **Reflect:** Identify two habits that you could continue to do or begin to do in order to reduce your risk of developing cancer.

Appendix B

Study 1 Organs Rubric

Organs

| Organ | Healthy # | Diseased # |
|--------|-----------|------------|
| Colon | 1 | 2 |
| Kidney | 3 | 4 |
| Liver | 5 | 6 |
| Lung | 7 | 8 |

Organ Descriptions

| Organ | N-C | C |
|--------|---|--|
| Liver | all one/solid color, smooth, normal/right shape, big, squishy, thicker | color differences/black areas, paler, black, discolored/two colors, lost color, rough, smaller, hard, swollen/bloated, looks fatty, decay/worn, misshapen, small, blockage |
| Colon | bigger, has folds, larger/long, has pathway/not blocked, normal/right shape, one/solid color, squishy | color variation black/bruised, discolored/two colors, smaller/short, no pathway/blocked, torn, misshapen |
| Kidney | good/clean color, smaller, kidney bean, whole, thick, normal/right shape, one/solid color, little fat, has pyramids | scrambled eggs, extra fat, squishy, discolored/two colors, bigger, torn/falling apart, decomposed/decayed, misshapen |
| Lung | Bigger, squishy, dark. (may be smaller depending on the lung shown) | Smaller, hard, lighter where the tumor is at, discolored (may be bigger depending on the lung shown) |

| Doesn't Count | Counts |
|--|--|
| <ul style="list-style-type: none"> -Descriptions of what organ doesn't have or what it isn't -Rotting -Has cancer cells -Has a tumor -Flat/thin -No holes, has holes, gaps -Change in texture unless it is specific -Change in color unless specific to organ -Kidney is white with a hole in it -Colon is a tube -"Normal" color -Organ looks "healthier" -For healthy colon "has fat" is not correct -Different sectioned parts of unhealthy things -Is the same all over -Looks clean/looks dirty | <ul style="list-style-type: none"> -Looks burnt -Change in color -Any mention of function -Abnormality = Growth -Dark spots and white spots = 1 adjective -Yellow with black spots = 2 adjectives -Black and yellow = 1 adjective -Firmness is a texture adjective -Descriptions that compare to food items (as long as they somewhat make sense) -Right/Normal shape -Brighter for healthy or pale for unhealthy -Has a growth -Abnormal cells -Clean color |

Organ Grading

| Score | Non-Cancerous Description | Cancerous Description |
|-------|---|---|
| 4 | Provides correct description with 3 or more adjectives (shape, color, size, texture(if several, count all adjectives), function) | Provides correct description with 3 or more adjectives (shape, color, size, texture (if several, count all adjectives), function*, abnormality*) |
| 3 | Provides correct description with 2 adjectives | Provides correct description with 2 adjectives |
| 2 | Provides correct description with 1 adjective (e.g., yellow folded cloth) | Provides correct description with 1 adjective |
| 1 | Provides description but gives inadequate or inaccurate detail of the organ (e.g., colon is a tube) | Provides description but gives inadequate or inaccurate detail of the organ (describes the wrong organ) |
| 0 | No Answer | No Answer |

Side Two Rubric

Discussion

| Score | 3 | 2 | 1 | 0 |
|--|---|---|--|-----------|
| <p>Summary</p> <p>Talked about what they learned and how they're affected by cancer.</p> <p><u>Function:</u> Any mention of function is acceptable (e.g. Cancer affects organs)</p> | <p>Provides at least 2 strong descriptions on both function of the organ AND/OR description of diseased state (color/texture) AND/OR provides additional information (e.g., cancer impedes organ function, contributing factors, wearing sunscreen to prevent skin cancer).</p> | <p>Provides single description on either function of the organ -OR- description of diseased state (color/texture) -OR- a vague description of both -OR- talks about contributing factors to cancer.</p> <p>Does not provide specific additional information (e.g., cancer impedes organ function).</p> | <p>Provides answer that shows incorrect, or incomplete information.</p> <p>Has vague/incomplete thoughts.</p> <p>Vague takeaways from the HHHU program. (e.g., cancer is gross; learned what healthy organs look like and what unhealthy ones look like)</p> | No answer |
| <p>Connect</p> | <p>Provides 2 or more key points such as physical activity, nutrition, wear sunscreen, avoiding smoking, and/or little to no alcohol with at least 2 specific descriptions.</p> | <p>Provides either 2 or more key points such as physical activity, nutrition, wear sunscreen, avoiding smoking, and/or little to no alcohol -OR- 1 key point with a specific description.</p> | <p>Provides either information that is not related or incomplete or incorrect -OR- 1 key point with no description.</p> | No answer |
| <p>Reflect</p> | <p>Provides 2 or more key points such as physical activity, nutrition, wear sunscreen, avoiding smoking, and/or little to no alcohol with at least 2 specific descriptions.</p> | <p>Provides either 2 or more key points such as physical activity, nutrition, wear sunscreen, avoiding smoking, and/or little to no alcohol -OR- 1 key point with a specific example (e.g., exercise: walk 3 times a week; nutrition: cut out red meat or eat more veggies).</p> | <p>Provides either information that is not related or incomplete or incorrect -OR- 1 key point with no description.</p> | No answer |

Mentioned Topics

| |
|--------------------------------|
| Topic (0 = NO, 1 = YES) |
| Drug Use |
| Tobacco Use |
| Exercise |
| Nutrition |
| Sugar Products |
| Organs |
| Cancer |
| Sunscreen |

| Doesn't Count | Counts |
|--|--|
| <p>-Organs can get cancer and cause death (needs to be more specific about what causes cancer)</p> | <p>-Daily regular exercise counts as a description -Example for description of sunscreen could be, "Use sunscreen so you don't get a sunburn" or "Use sunscreen so you don't get skin cancer". -Will never choose to smoke or drink, are examples of avoiding tobacco and alcohol</p> <ul style="list-style-type: none"> ● Note: AT stands for alcohol and tobacco, and ATOD stands for alcohol tobacco & other drugs. ● SSB = Sugar Sweetened Beverages ● PA = Physical activity ● F/V = fruits or vegetables |

Appendix C

Healthy Habits, Healthy U 8th Grade Worksheet

Student Name _____ Teacher Name _____

Directions: **Look** at each pair of organs and write down the name of the organ. **Decide** which organ looks non- cancerous or cancerous and write down the number of the organ. **Describe** the differences you see between the non- cancerous and cancerous organs in column.

| #1 | #2 | |
|---------------|---|---------------|
| Name of Organ | How are the non-cancerous and cancerous organs different? | |
| | Non-Cancerous | Cancerous |
| | Organ # _____ | Organ # _____ |
| | Organ # _____ | Organ # _____ |
| | Organ # _____ | Organ # _____ |
| | Organ # _____ | Organ # _____ |

Today we discussed how healthy habits can reduce cancer risks.

- ✓ In a few sentences, tell us what you learned from the Healthy Habits, Healthy U Program (video, articles, and presentations).

2. Fill in the table below. Use complete sentences and be specific in your answers.

| Identify your current lifestyle choices that increase your risk for cancer. | Identify changes will you make in the next 30 days that will decrease your risk for cancer. |
|--|--|
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |

Appendix D
Study 2 Organs Rubric

Organs

| Organ | Healthy # | Diseased # |
|--------|-----------|------------|
| Colon | 1 | 2 |
| Kidney | 3 | 4 |
| Liver | 5 | 6 |
| Lung | 7 | 8 |

Organ Descriptions

| Organ | N-C | C |
|--------|---|--|
| Liver | all one/solid color, smooth, normal/right shape, big, squishy, thicker | color differences/black areas, paler, black, discolored/two colors, lost color, rough, smaller, hard, swollen/bloated, looks fatty, decay/worn, misshapen, small, blockage |
| Colon | bigger, has folds, larger/long, has pathway/not blocked, normal/right shape, one/solid color, squishy | color variation black/bruised, discolored/two colors, smaller/short, no pathway/blocked, torn, misshapen |
| Kidney | good/clean color, smaller, kidney bean, whole, thick, normal/right shape, one/solid color, little fat, has pyramids | scrambled eggs, extra fat, squishy, discolored/two colors, bigger, torn/falling apart, decomposed/decayed, misshapen |
| Lung | Bigger, squishy, dark. (may be smaller depending on the lung shown) | Smaller, hard, lighter where the tumor is at, discolored (may be bigger depending on the lung shown) |

| Doesn't Count | Counts |
|--|--|
| <ul style="list-style-type: none"> -Descriptions of what organ doesn't have or what it isn't -Rotting -Has cancer cells -Has a tumor -Flat/thin -No holes, has holes, gaps -Change in texture unless it is specific -Change in color unless specific to organ -Kidney is white with a hole in it -Colon is a tube -"Normal" color -Organ looks "healthier" -For healthy colon "has fat" is not correct -Different sectioned parts of unhealthy things -Is the same all over -Looks clean/looks dirty | <ul style="list-style-type: none"> -Looks burnt -Change in color -Any mention of function -Abnormality = Growth -Dark spots and white spots = 1 adjective -Yellow with black spots = 2 adjectives -Black and yellow = 1 adjective -Firmness is a texture adjective -Descriptions that compare to food items (as long as they somewhat make sense) -Right/Normal shape -Brighter for healthy or pale for unhealthy -Has a growth -Abnormal cells -Clean color |

Organ Grading

| Score | Non-Cancerous Description | Cancerous Description |
|-------|---|---|
| 4 | Provides correct description with 3 or more adjectives (shape, color, size, texture(if several, count all adjectives), function) | Provides correct description with 3 or more adjectives (shape, color, size, texture (if several, count all adjectives), function*, abnormality*) |
| 3 | Provides correct description with 2 adjectives | Provides correct description with 2 adjectives |
| 2 | Provides correct description with 1 adjective (e.g., yellow folded cloth) | Provides correct description with 1 adjective |
| 1 | Provides description but gives inadequate or inaccurate detail of the organ (e.g., colon is a tube) | Provides description but gives inadequate or inaccurate detail of the organ (describes the wrong organ) |
| 0 | No Answer | No Answer |

Side-two Rubric**Question 1 Summary**

| Score | 3 | 2 | 1 | 0 |
|---|--|--|--|-----------|
| Quantity Talked about what they learned and how they're affected by cancer. <u>Function:</u> Any mention of function is acceptable (e.g. Cancer affects organs). | Provides at least 2 accurate descriptions on both function of the organ AND/OR description of diseased state (color/texture) AND/OR provides additional information (e.g., cancer impedes organ function, contributing factors, wearing sunscreen to prevent skin cancer). | Provides single description on either function of the organ -OR- description of diseased or healthy state (color/texture) = OR- talks about contributing factors or cancer prevention (ex. learned how to prevent cancer/how to get cancer) -OR- gives general information about cancer or treatment. | Answer is incorrect. -OR- Irrelevant to the question (e.g., cancer is gross; learned what healthy organs look like and what unhealthy ones look like) | No answer |
| Quality | High Detailed or specific. | Medium Some description, description that illustrates their knowledge. | Low Incomplete or vague, or listing vs. a description. | No answer |

Question 2 Table of Health risks and prevention strategies

% Correct Identified Cancer Risks (0%-100%) *If the three answers describe basically the same thing the score would be 33%. *If the answers are under the same category (DTENSOCS) then group them together (such as: fruits and vegetables or soda and candy)

% Correct Identified Prevention Strategies (0%-100%) *If the three answers describe basically the same thing the score would be 33%. *If the answers are under the same category (DTENSOCS) then group them together (such as: fruits and vegetables or soda and candy)

Overall, on side-two

Mentioned Topics

| Topic (0 = NO, 1 = YES) |
|--|
| Drug/Alcohol Use |
| Tobacco Use |
| Exercise/Sedentary behaviors |
| Nutrition (no junk food, F/V, processed foods, red meat, etc.) |
| Sugar Products (candy, SSB, etc.) |
| Organs |

| |
|-----------|
| Cancer |
| Sunscreen |

| Doesn't Count | Counts |
|---|--|
| <p>-Organs can get cancer and cause death (needs to be more specific about what causes cancer)</p> <p>- Pollution and other environmental factors (e.g., Hair spray)</p> <p>- Chemicals</p> <p>- Genetics</p> <p>-Sleep</p> <p>- Go outside</p> <p>- Eat something other than [junk food]</p> <p>- Be healthy</p> | <p>-Daily regular exercise counts as a description</p> <p>-Example for description of sunscreen could be, "Use sunscreen so you don't get a sunburn" or "Use sunscreen so you don't get skin cancer".</p> <p>-Will never choose to smoke or drink, are examples of avoiding tobacco and alcohol</p> <p>- Code 'coffee' as a sugar sweetened beverage, ditto for monster, sugary foods, candy, water, etc.</p> <p>- Eat less junk food</p> <p>- Mother smokes (second hand smoke)</p> <ul style="list-style-type: none"> ● Note: AT stands for alcohol and tobacco, and ATOD stands for alcohol tobacco & other drugs. ● SSB = Sugar Sweetened Beverages (or water) ● PA = Physical activity ● F/V = fruits or vegetables |