Abstracts

Fredrick Douglass High School Biomedical Sciences Pathway

Poster Session

Gatton Student Center Grand Ballroom

12:00 – 12:45pm

Posters 1 – 17

Abstracts

Poster Number 1

Title: Descriptive Epidemiology of Leukemia

Authors/Presenters: Tate Johnson, Sutton Tyner, Cameron Moore

Abstract: Leukemia is cancer of blood forming tissues. The cancer is divided into four types: Acute Myeloid, Chronic Myeloid, Acute Lymphocytic, and Chronic Lymphocytic. Leukemia has one of the highest incidence rates among all cancers and is most common amongst men due to mutations in the x chromosome creating a greater risk for Leukemia. A number of risk factors could increase risk for developing Leukemia, including lifestyle habits, chemical and radiation exposure, and even specific genetic disorders like down syndrome. While specific Leukemia screenings can be challenging, there are multiple options for leukemia patients when considering screenings and treatment decisions; the effectiveness can differ between the varying types of leukemia. Treatments include chemotherapy, radiation, targeted therapy, and bone marrow transplants, among others. Leukemia patients experience frequent checkups after treatments to monitor relapse possibilities.

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 2

Title: Epidemiology of Pancreatic Cancer

Author/Presenters: Ivory Addo, Elijah Barton, Tanner Catrine

Abstract: This presentation depicts the incidence and mortality by age and gender among populations on a regional (Kentucky and United States) and global scale with related topics of research such as the types, risk factors, diagnosis, and treatment of pancreatic cancer. 90% of pancreatic cancers are classified as adenocarcinoma[1], however others may include pancreatic neuroendocrine tumors (PNETs). Pancreatic cancer has some of the highest mortality rates among cancers, making early detection of the disease difficult. Since the pancreas lies deep within the body, tumors are unable to be identified through routine physical examination. It's not until the cancer on the pancreas becomes larger or spreads that symptoms become prevalent, leading to diagnosis and further treatment.[2] In the United States, pancreatic cancer accounts for approximately 3% of all cancers, making it the eighth most common in women and tenth most common in men.[1] Pancreatic cancer is the fourth leading cause of cancer death in both men and women in the United States, accounting for 7% of all cancer deaths, and slowly increasing each year since 2000.[1] The global incidence rates in Europe, South American, and Asia for pancreatic cancer are greater in men. Global mortality rates are also the highest among both men and women, although the mortality of men seems to be greater. Incidence and mortality does not indicate whether an individual's experience with the disease will reflect the survival rates of pancreatic cancer, given that chance of survival is only an estimate based on statistics.

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 3

Title: Descriptive Epidemiology of Gastric Cancer

Authors/Presenters: Caroline Delzotti, Nikkita Espy

Abstract: Diagnosing gastric cancer is difficult due to the challenges that are faced with catching the illness early. When symptoms are felt, that normally indicates a graver prognosis than expected. Annual testing for gastric cancer is usually not recommended due to the illness not being as prevalent as other cancers. A typical diagnostic testing involves an endoscopy, which looks down the esophagus and stomach for lesions; but the most effective test for catching the illness early can be a genetic test. Although gastric cancer is more common in East Asian people, compared to the United States, they have a higher survival rate. According to Balakrishnan, when comparing Americans to East Asian people, 27% of gastric cancers diagnosed at an early stage are from the US, while 50% are from Japan. Being more common in East Asia, researchers focus on what those risk factors are and why they are more prevalent in those countries; this allows people to avoid those risks and make an education decision on how to go about getting treated.

Balakrishnan, M., George, R., Sharma, A., & Graham, D. Y. (2017). Changing trends in stomach cancer throughout the world.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6918953/

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 4

Title: Colorectal Cancer Epidemiology and Biostatistics in the United States

Authors/Presenters: Bryce Gibson, Jules Timmons, Davis Brown

Abstract: There have been 151,030 cases and 52,580 deaths concerning colorectal cancer within the past year (American Cancer Society, 2022). This has been linked to the prevalence of smoking, obesity, and poor diet and exercise regimes in American society. Although this cancer has a slow progression rate and is usually treatable with surgery, the proliferation can be slowed or even halted with a healthy diet and exercise regime, in unison with healthy behavioral tactics (i.e. no smoking or exposure to toxic chemicals). With most of the risk factors being dependent on human behavior, colorectal cancer is still the 4th most prevalent cancer in the United States. Many of the decisions we make in our lives can create a steady increase of the chance of colorectal cancer. With aging comes the chance of the depletion of the colon, as well as the formation of unhealthy, cancerous cells. This is clearly depicted by looking at the prevalence of this cancer in what are considered the “unhealthiest” states within the United States, such as Maryland (76% of population), California (73% of population), and even our own home, Kentucky (70% of population) (cancer.org).

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 5
Title: Uncovering the Truth about Prostate Cancer in African American Males
Authors/Presenters: Hillary Thompson, Velina Kuvliev, Lovelyn Fields-Cotton
Abstract: African American males have a higher disposition to prostate cancer than their white counterparts. They have a 73.0 per 100,000 population death rate compared to white males that are 30.2 per 100,000 population (Woods, 2015). This has caused many to question why they are more predisposed to prostate cancer and the reasoning behind it. This presentation explores what prostate cancer is, the screening and diagnosis, how this impacts men on a state, country, and global scale, the possible treatments, and the future of this disease. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4654412/
Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 6

Title: The Risk of Excess Body Weight for Pancreatic Cancer: Incidence and Mortality

Authors/Presenters: Ethan Norris, Brinlee Bowen, and Elle Moses

Abstract: Pancreatic cancer has one of the highest mortality rates per incidence of any cancer, with an average relative 5-year survival rate of just 5%. As such, our review aimed to target ways to better the prognosis of pancreatic cancer, namely through modifiable risk factors. One of the most common modifiable risk factors of pancreatic cancer is obesity. In 2012, male pancreatic cancer linked to obesity made up 6% of all male cancers attributed to excess body weight and 7% of all male pancreatic cancer cases. Additionally, the risk for pancreatic cancer increases an estimated 10% with every 5 unit increase in BMI. Obesity, however, does not just affect the incidence rate of pancreatic cancer, it also affects the mortality rate. Patients with excess body weight are shown to have an overall poorer prognosis after pancreatic surgery, the most effective treatment for pancreatic cancer. This is supported by the correlation between states with high pancreatic cancer mortality rates and states with high obesity rates. In conclusion, this data suggests that incidence and mortality rates of pancreatic cancer could be reduced by targeting obesity.

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 7

Title: Descriptive Epidemiology of Endometrial Cancer

Authors/Presenters: Riley Hooks, Sydney Cox, Kylie Profitt

Abstract: Endometrial cancer is the abnormal growth of mutated cells in the uterus, forming a tumor. Types of this cancer can include endometrioid adenocarcinoma (most common), uterine papillary serous carcinoma, uterine clear cell carcinoma, uterine carcinosarcoma, and uterine sarcoma. Some risks that can play a factor in the development of endometrial cancer include never having been pregnant, more years of menstruation, PCOS, Lynch syndrome, family history, and obesity. Globally, endometrial cancer has a relatively low incidence, however, the burden is higher in southern Africa and among Black women. Incidence and mortality nationally and in Kentucky, however, are too unstable to have an accurate number. Endometrial cancer is typically diagnosed via either a pap smear or transvaginal ultrasound, followed by a biopsy if an abnormality is found. The transvaginal ultrasound and pap smear detect these abnormalities, and the biopsy is where a sample is taken from an abnormal mass and examined under a microscope to see if it is cancerous. This cancer is typically treated with surgery and chemotherapy in the earlier stages, but later on when surgery is not an option, hormone therapy and radiation can be used.

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 8

Title: Epidemiology of Leukemia

Authors/Presenters: Ilana Williams, Kylah Gabbard, and Xavier Hsiu

Abstract: Leukemia is the cancer of blood forming tissue that can be detected through Complete Blood Counts (CBC), a bone marrow test, and many other screening tests. There are four main types of leukemia: acute myeloid leukemia, chronic myeloid leukemia, acute lymphocytic leukemia, and chronic lymphocytic leukemia. There are certain risk factors that may make one more likely to develop any type of leukemia, such as old age and exposure to radiation. These risk factors, among others, make the leukemia incidence rate 15.8 cases per 100,000 cases in Kentucky and 14.2 cases per 100,000 cases in the United States. As a result of effective treatments, the mortality rate drops to 6.9 cases per 100,000 cases in Kentucky and 6.3 cases per 100,000 cases in the United States. Globally, the incidence and mortality of Leukemia increases as the age of the patient increases for most leukemia subtypes. Some of the effective treatments for leukemia include bone marrow transplant where healthy stem cells from bone marrow are transplanted into the body, which has a 65% five year survival rate. Other treatment approaches may include chemotherapy, radiation, immunotherapy, and targeted therapy. These treatments for Leukemia have three stages: induction, consolidation, and maintenance. There are more treatments being introduced such as Car T-cell therapy to better help decrease the incidence and mortality of leukemia.

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 9
Title: Descriptive Epidemiology of Non-Hodgkin's Lymphoma (NHL)
Authors/Presenters: Kyra Tolbert, Emma O'Ferral and Nyla Washington
Abstract: Non-Hodgkin's Lymphoma (NHL) is cancer starting in lymphocytes with lymph nodes, spleen, bone marrow, thymus, adenoids, tonsils and digestive tract being major sites. NHL incidence rates are higher in men than women considering survival rates for NHL are greater in women than men. Risk factors like age, race, breast implants, body weight, geography, family history and genetic mutations increase susceptibility. Screening includes physical exam, PET scan, MRI, ultrasound, biopsy, and PCR chromosome test. From 2014-2018, in the US, 355,599 new cases were reported and 101,555 people died. The current general treatment for NHL is chemotherapy.
Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 10

Title: The Descriptive Biostatistics of Non-Hodgkin's Lymphoma

Authors/Presenters: Lucas Poynter, Grant Stamper, Shanice White

Abstract: This project seeks to take an in depth look at Non-Hodgkin's Lymphoma (NHL) background, suspected risk factors, diagnostics, and treatment. Non-Hodgkin's Lymphoma is the cancer of the lymphocytes/white blood cells. Risk factors associated with Non-Hodgkins Lymphoma include biological factors such as being Caucasian, behavioral factors, such as smoking, and environmental factors, such as ultra-violet radiation. It will highlight the future direction in which treatment for NHL is going, such as new clinical studies of new forms of treatments like targeted therapies, immunotherapies and stem cell treatments. The project too will present the incidence and mortality rate of NHL in Kentucky, Which tend to have higher rates of Incidence and Mortality rates being Webster County; the United States, Which have higher incidence rates in Florida and higher mortality rates in Indiana; Globally, which have higher incidence rates in Australia and higher mortality rates in within the continent of Africa, while paying attention to the age, gender, and ethnicity of patients who are diagnosed.

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 11

Title: Stomach Cancer Research Project

Authors/Presenters: Lauren Prewitt, James Harrison Hixon, Prosperity Meade

Abstract: This project seeks to answer questions about the risk factors, backgrounds, methods of diagnosis, incidence and mortality rates, and treatments of stomach cancer on a statewide, national, and global standpoint. Risk factors for stomach cancer include gender, diet, H. pylori bacteria, ethnicity, and genetics. Diagnostics for stomach cancer include Upper endoscopy, biopsy, laparoscopy, upper gastrointestinal series, and computed tomography. Treatments are determined by staging, and include chemotherapy, radiation therapy, and surgery. The project primarily focused on why stomach cancer is more common in Asia than in the US, which is due to the fact that they have different lifestyle choices such as diets high in shellfish. H. Pylori is a bacteria found in contaminated water causing it to be in seafood. Further research to be conducted is to what extent does H. pylori affect cancer?

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 12

Title: Lung Cancer: What You Need to Know

Authors/Presenters: Alexis Brown, Joshua Carr, & Julianne Fisher

Abstract: On average, Lung Cancer accounts for one in every five cancer deaths worldwide. Kentucky is ranked the number one state in Lung Cancer deaths nationwide. Cigarette smoking is the number one risk factor for this disease and increases an individual's risk of getting Lung Cancer 15-30 times the normal rate. It is this correlation that justifies why Lung Cancer is so prevalent in the Southeastern United States. It is important to catch cancer early in order for it to be treated and hopefully cured. Given that there is no annual screening for Lung Cancer makes early diagnosis and treatment difficult. This presentation serves to share the dangers of smoking and an overview of Lung Cancer, which includes diagnosis, treatment, and more.

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 13

Title: Understanding Breast Cancer on the Local, National, and International Level

Authors/Presenters: Jessica Rowell, Eleanor Harney, Eric Chaneou

Abstract: In 2022, an estimated 338,650 women in the United States will be diagnosed with breast cancer, and out of the women diagnosed, 43,250 cases will be fatal. In an attempt to lower both the incident and mortality rate we looked at known and suspected risk factors of breast cancer. We found that besides the general risk factors for all cancer types, dense breast tissue and a mutation on the BRCA1 or BRCA2 gene are the most common specific risk factors for breast cancer. Routine screenings are recommended for women at or above the age of 45. Mammograms are used to examine the breast for tumors and abnormalities and should be taken once to twice a year. Once diagnosed with breast cancer, depending on the stage, which is determined by diagnostics, many treatments are available. For early stages, the goal of treatment is to remove the tumor by surgery, followed by chemotherapy to kill any remaining cancerous cells. Hormonal, radiation, and immunotherapy are then used in later stages when the cancer has spread to other areas of the body. Our project aims to better understand progressing in efficiency in treating and diagnosing breast cancer in order to reduce the incident and mortality rate.

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 14

Title: Descriptive Epidemiology of Renal Cancer

Authors/Presenters: Rachel Brown, Gavin Jones, and Kendall McCown

Abstract: The kidneys filter blood to remove impurities, excess minerals, salts, or water. Renal cancer begins when cells in the kidneys (one or both) start growing abnormally to create a mass called 'renal cortical tumor'[1]. In renal cancer, the prevalence is higher in African American men. One of the biggest behavioral and environmental factors is hypertension. "In the United States, history of hypertension has been estimated to double the risk of kidney cancer in white patients, and triple the risk in black patients.[2]" In addition, "high rates of high blood pressure in blacks may be due to the genetic makeup of people of African descent.[3]". In more background research we found "association between a genetic variation of the MYH9 region on chromosome 22 with glomerulosclerosis, a condition previously attributed to "hypertensive nephrosclerosis and found much more frequently in black patients with end-stage renal disease than in whites with end-stage renal disease.[4]"

1-Kidney cancer: Introduction. Cancer.net [10/2020] Retrieved 1/2022 from:
https://www.cancer.net/cancer-types/kidney-cancer/introduction
2- Oncol, J. [December 20, 2018] Epidemiology and risk factors for kidney cancer. Retrieved from:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6299342/
3- Beckerman, J. [September 1, 2021] High blood pressure in blacks. Retrieved from:
https://www.webmd.com/hypertension-high-blood-pressure/guide/hypertension-in-african-americans
4- Fuchs, F. [February 7, 2011] Why do black Americans have a higher prevalence of hypertension? Retrieved from: https://www.ahajournals.org/doi/10.1161/hypertensionaha.110.163196

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 15

Title: Descriptive Epidemiology of Carcinoma of the Breast

Authors/Presenters: Trinity Black, Evan Covert, Megan Klose

Abstract: Breast Cancer is the most common form of cancer for women in the world[1]. Data trends show that White women have the highest risk of being diagnosed with breast cancer, however, African American women tend to have more aggressive types of breast cancer and are most commonly diagnosed under the age of 40[2]. Most women who are diagnosed with breast cancer do not have a family history of the disease, but the risk of developing it has been shown to increase with family history[2]. Biological instances, genetics, environmental, and behavioral risk factors are seen with incidences of developing breast cancer. Many include age, race, gender, inherited mutations, environmental carcinogens, tobacco exposure, etc[3]. There are 4 main types of breast cancer, typically starting in the milk ducts and milk glands[4]. Although treating this cancer at each stage is different, some of the treatments include surgery, radiation therapy, chemotherapy, hormone therapy, etc[5]. With earlier detection, individuals that start treatment of breast cancer in the beginning stages of the disease have a higher survival rate than if commenced in the later stages[6].

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 16

Title: Descriptive Epidemiology of Lung Cancer

Authors/Presenters: Jack Deitz, Kirk Tackett, and Shay Dann

Abstract: Lung cancer is one of the most preventable cancers[18] mainly due to it being caused by exposure to harmful chemicals from smoke or other air pollutants[3]. Smoking has harmful chemicals that affect everyone, but specifically women. The chemicals in cigarettes cause cellular level damage towards lung cells that is irreversible leading to somatic mutations in the TP53, EGFR, or KRAS genes[6] eventually leading to the formation of tumors in these cells. While comparing the Human Development Index to the incidence and mortality of lung cancer worldwide, it can be seen that more developed regions have a higher incidence and mortality rates due to access to better health care and more exposure to harmful chemicals[17]. Overall, there is only either a 26% or 7% 5-year relative survival rate for lung cancer depending on the type you have[19], making it very critical to further our prevention, diagnosis, and treatment of it.

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway

Abstracts

Poster Number 17

Title: Kidney and Renal Cancer

Authors/Presenters: David Marin, Annamarie Seamans, Maria Wanderley

Abstract: By 2018, there were an estimated 582,727 people living with kidney and renal pelvis cancer in the United States. Kidney cancer causes rapidly proliferating cells in the kidney and its inner lining, currently very pervasive in the United States population, making the top 10 cancer list for both men and women. This cancer is usually diagnosed by blood tests, with the most diagnosed kind of kidney cancer being renal cell carcinoma. Our group wanted to understand the impact of race/ethnicity on kidney and renal cancer susceptibility, and ultimately discovered kidney cancer is more prevalent in American Indians and Alaskan Natives than Caucasians. In relation to these ethnic factors, we focused on environmental factors globally in relation to kidney and renal cancer. We found that even though development of countries is beneficial for the prosperity of countries, the air pollution created through that development has been shown to have a correlation to the development of kidney cancer in those countries. Although the incidence rate for North America is 12.2 per 100,000 the mortality rate is 2.1 per 100,000 due the countries in North America being more developed and able to diagnose renal and kidney cancer early on and treat it more effectively.

Funding: Fredrick Douglass High School Biomedical Sciences (BMS) Pathway