

Committee: World Health Organization (WHO)

Issue: Limiting the consequences of the pricing appraisal of anti-cancer drugs in East Asia and Mediterranean region

Student Officer: Foteini Gnardelli

Position: Deputy President

PERSONAL INTRODUCTION

Dear Delegates,

My name is Foteini Gnardelli, I am an IB1 student studying at Pierce- American College of Greece and it is my great honor to serve as a Student Officer of the World Health Organization for the 6th ACGMUN. MUN is a great way for teenagers to get acquainted with the world and the issues that concern it, whilst meeting wonderful people who become longtime friends.

The aim of this year's WHO is to form solutions in order to tackle the issues related to health care. The topic that will be studied throughout this guide is “limiting the consequences of the pricing appraisal of anti-cancer drugs in East Asia and the Mediterranean region”. It is a significant issue in today’s world since it concerns matters that are of most recent developments; therefore, it is of utmost importance that it is discussed and debated.

This guide is one source for you to use when studying the topic, however, you are expected to further extend your knowledge and do more thorough research on this issue as well as learn about your assigned country’s stance on the topic.

If you have any questions, please don’t hesitate to contact me via email at: fotini.gnardelli67@gmail.com. I am open to any and all questions, regarding either the topic, the committee as a whole, or procedural matters, that may arise.

I look forward to meeting you all!

Best regards,

Foteini Gnardelli

TOPIC INTRODUCTION

Cancer is one of the main causes of high rates of fatality in today's world, with over 18.1 million new cases per year and around 9.6 million deaths¹ and that is why the issue of pricing appraisal for anti-cancer drugs in East Asia and the Mediterranean region is one of much significance and relevance in today's society. If the necessary drugs do not become more accessible to the general population the number is expected to rise to 30 million people by 2040. Over 70% of the deaths caused by such a fatal disease are in Less Economically Developed Countries (LEDCs), thus, concerns have been raised regarding the availability of the necessary drugs to tackle the illness in accordance with the pricing of such. Particularly, the high pricing of anti-cancer drugs and of the respective treatments limits the means of curing the disease for low-income households. Not only do elevated prices of such drugs affect patients but also healthcare institutes and hospitals since it is difficult for them to access said drugs and provide them to patients.

A study was conducted in 2017 by the National Library of Medicine² with the aim of presenting the rates with which pricing for anti-cancer drugs was affected through regions in East-South Asia, the Western Pacific, and the Eastern Mediterranean.

The research was conducted through a survey sent to 10 separate countries from the locations mentioned above and overlooked the pricing of 26 types of anti-cancer drugs. The results of the study showed that the estimated average price for anti-cancer drugs for the 10 countries surveyed was US \$814.07 for less economically developed countries, and US \$1148.19 for more economically developed countries (MEDCs). Notably, such drugs are characterized by particularly high prices.

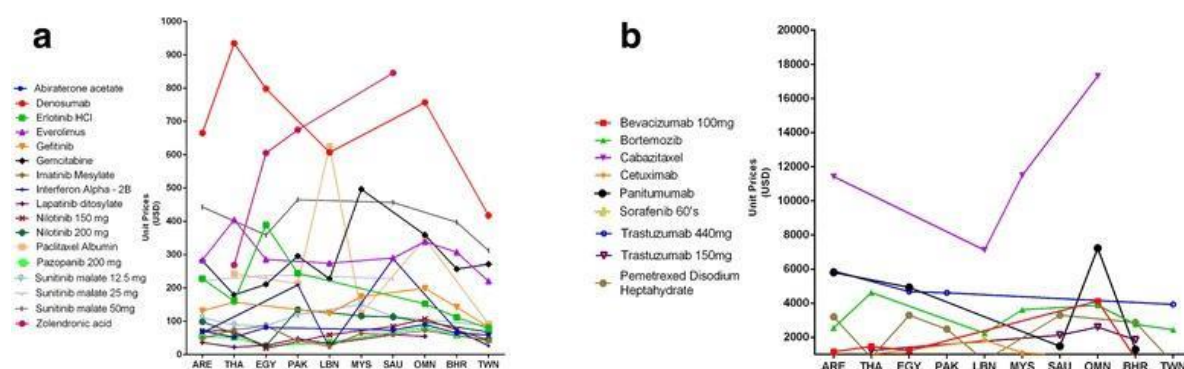


Figure 1: Graphs depicting the study's results on the pricing of drugs in the countries the research concerns³

¹ "Availability, Affordability, Access, and Pricing of Anti-cancer Medicines in Low- and Middle-Income Countries: A Systematic Review of Literature." *Frontiers*, www.frontiersin.org/articles/10.3389/fpubh

² National Library of Medicine. "Pricing Appraisal of Anti-cancer Drugs in the South East Asian, Western Pacific and East Mediterranean Region." *PubMed*, 28 Dec. 2017, www.pubmed.ncbi.nlm.nih.gov/29282008/

³ National Library of Medicine. "Pricing Appraisal of Anti-cancer Drugs in the South East Asian, Western Pacific and East Mediterranean Region." *PubMed*, 28 Dec. 2017, www.pubmed.ncbi.nlm.nih.gov/29282008/

Further studies have been conducted regarding said issue. According to a World Health Organization technical report, countries that are less economically developed are less likely to have the resources available to tackle cancer. "It was reported that 32.0% and 57.7% of cancer medicines on the essential medicine list were available in Less Economically Developed Countries (LEDCs), respectively, only if patients were willing to incur their full costs"⁴. Less economically developed countries provide restricted access to essential drugs because there is limited availability in health centers and patients do not have the means available to purchase such expensive medicine.

Thus, it is of utmost importance that the issue of the pricing appraisal of anti-cancer drugs is addressed as swiftly and as efficiently as possible so as to prevent any major consequences yet to come and mend the ones already seen in society.

DEFINITION OF KEY TERMS

Cancer

"Cancer is a disease in which some of the body's cells grow uncontrollably and spread to other parts of the body. Cancer can start almost anywhere in the human body, which is made up of trillions of cells. Normally, human cells grow and multiply (through a process called cell division) to form new cells as the body needs them. When cells grow old or become damaged, they die, and new cells take their place. Sometimes this orderly process breaks down, and abnormal or damaged cells grow and multiply when they shouldn't"⁵

Chemotherapy

"A cancer treatment where medicine is used to kill cancer cells"⁶

Less Economically Developed Countries (LEDCs)

"Least economically developed countries (LEDCs) are low-income countries confronting severe structural impediments to sustainable development. They are highly vulnerable to economic and environmental shocks and have low levels of human assets"⁷

⁴ "Availability, Affordability, Access, and Pricing of Anti-cancer Medicines in Low- and Middle-Income Countries: A Systematic Review of Literature." *Frontiers*, www.frontiersin.org/articles/10.3389/fpubh

⁵ "What Is Cancer?" *National Cancer Institute*, 5 May 2021, www.cancer.gov/about-cancer/understanding/what-is-cancer

⁶ "Chemotherapy." *Nhs.uk*, 20 Oct. 2017, www.nhs.uk/conditions/chemotherapy/

⁷ "Least Developed Countries (LDCs) | Department of Economic and Social Affairs." *Welcome to the United Nations*, www.un.org/development/desa/dpad/least-developed-country-category.html

Leukemia

“Leukemia is a blood cancer caused by a rise in the number of white blood cells in your body. Those white blood cells crowd out the red blood cells and platelets that your body needs to be healthy. The extra white blood cells don’t work right”⁸

More Economically Developed Countries (MEDCs)

“More economically developed countries (MEDCs) are countries that have a thoroughly organized economy and are more developed than most. The United Nations identifies the United States, Canada, Japan, Australia, New Zealand, and all the countries of Europe as MEDCs.”⁹

Prescription Drugs

“A drug that can only be bought if a doctor orders it”¹⁰

Price Appraisal

The particularly high price of a good or service determined by a market price setter selected by the manager of a company or an institute¹¹

Topoisomerase

“A class of enzymes that alter the supercoiling of double-stranded DNA.”¹²

Treatment

“The use of drugs, exercises, etc. to cure a person of an illness or injury”¹³

Tumor

“An abnormal mass of tissue that forms when cells grow and divide more than they should or do not die when they should”¹⁴

⁸ "Leukemia." *WebMD*, 13 Sept. 2016, www.webmd.com/cancer/lymphoma/understanding-leukemia-basics

⁹ "More Economically Developed Countries." *Britannica Kids*,

www.kids.britannica.com/kids/article/more-economically-developed-countries/476297

¹⁰ "Prescription Drug." *Cambridge Dictionary | English Dictionary, Translations & Thesaurus*, www.dictionary.cambridge.org/dictionary/english/prescription-drug

¹¹ "Appraised Price Definition." *Law Insider*, www.lawinsider.com/dictionary/appraised-price

¹² "Medical Definition of Topoisomerase." *RxList*, www.rxlist.com/topoisomerase/definition.htm

¹³ "Treatment." *Cambridge Dictionary | English Dictionary, Translations & Thesaurus*, www.dictionary.cambridge.org/dictionary/english/treatment

¹⁴ "NCI Dictionary of Cancer Terms." *National Cancer Institute*, www.cancer.gov/publications/dictionaries/cancer-terms/def/tumor

BACKGROUND INFORMATION

Invention of anti-cancer drugs

Anti-cancer drugs have been discovered and used for around 100 years with the first successful drug for curing tumor cancer, called “antimetabolite methotrexate”, being invented in 1956. Further research was later conducted for cancer treatment and chemotherapy was discovered. Chemotherapy is now the most effective therapy for cancer and was first found in the early 20th century when it was used by Dr Edward Krumbhaar to treat a patient in 1919 and having successfully cured a patient in 1956. At first it was not intended to be a treatment for cancer. Studies regarding the nature of chemotherapy first started during the course of World War II when it was first noticed by two Yale pharmacists who had noticed some specified toxins in a form of gas used during a battle. During that battle, the US army was exposed to the so-called ‘mustard gas’. The gas was suspected of causing toxic changes to the skin cells and it was discovered that it later developed into the cells in the blood. Further studies were also conducted after WWII and more combinations of the discoveries were created such as clofarabine, cladribine, and more. Ultimately, the modern version of chemotherapy was developed in the late 1960s and has been used as a form of treatment for several years now.

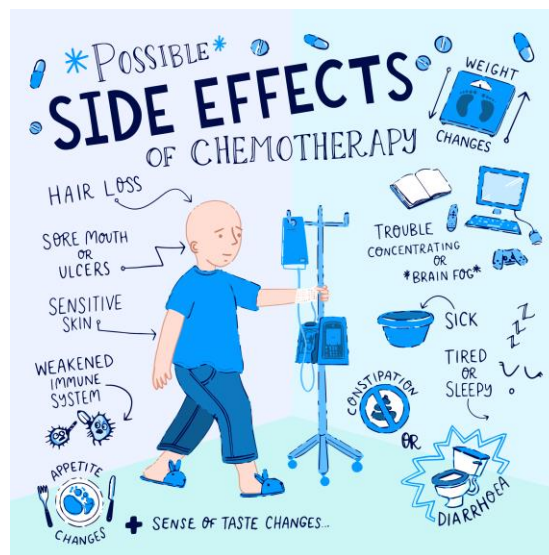


Figure 2: Cartoon depicting the common side effects of chemotherapy¹⁵

The different types of anti-cancer drugs

Alkylating agents

¹⁵ "Side Effects of Chemotherapy." Teenage Cancer Trust, www.teenagecancertrust.org/information-about-cancer/side-effects-of-chemotherapy

Alkylating agents are a form of treatment used to stop the cancer cells from spreading to other parts of the body by damaging the deoxyribonucleic acid (DNA). Such treatment is used to treat different types of cancer including those in the lung and breast.

Nitrosoureas

Nitrosoureas is a form of alkylating agent that is able to travel into the brain. Such a drug is able to travel through the blood-brain barrier, a barrier that forbids drugs from entering the brain, thus the specific drug is able to treat types of brain tumor as well as brain cancer.

Antimetabolites

Antimetabolites is a type of drug that interferes with the DNA and the ribonucleic acid (RNA) of a person, building a copy of it, and prohibits toxic cancer cells from spreading around. Such a treatment is commonly used to treat leukemia, and different types of cancer.

Topoisomerase inhibitors

These types of drugs are used to interfere with enzymes called topoisomerases and separate the DNA and multiply it. This type of drug is used to treat all types of cancer but primarily, leukemia.

Mitotic inhibitors

Such drugs are made from plant cells and natural resources. Similar to most drugs, they are used to stop the cancer from multiplying and spreading to further parts of the body, divided to form new cells.

Reasons for such an increase in price

The global annual spending on anti-cancer drugs and treatment is \$100 billion and it is expected to rise to \$150 billion due to a number of reasons. Anti-cancer drugs have taken much research and many firms have invested large sums of money to develop such drugs. Thus, firms are prompted to raise their prices in order to cover the expenses of the development of such drugs. There is, also, a large amount of manpower put into the creation and the development of the treatment and only a small number of skilled workers are able to reach the high standards of creating such an intricate treatment and hence such services tend to be quite expensive.

Consequences of pricing appraisal

The high prices of anti-cancer drugs is a phenomenon that has been prominent in society ever since its discovery. The appraisal of said prices has several consequences that not only affect individuals but also the public as a whole. Due to the extremely high prices patients diagnosed with cancer are unable to get the proper treatment and cure since they often are unable to afford it. Individuals remaining untreated leads to general tragedies for the families of the patients and may result in them spending all their money on attaining the needed drugs, leaving them with little to fend for. Furthermore, patients not getting the right treatment lead to unsustainability of the society since it creates certain price burdens that most citizens may not be able to cover, exacerbating already existing social inequalities. Some forms of cancer are proven to be incurable; however, patients are still advised to undergo treatment with the use of several different drugs to tackle the disease, creating a virtual monopoly.

MAJOR COUNTRIES AND ORGANIZATIONS INVOLVED

Taiwan

Based on the study conducted by the National Library of Medicine¹⁶, Taiwan had the lowest price for anti-cancer drugs with the price varying depending on the nature of the detected cancer and on which area of the body it is based. The mean price per unit is \$492.61. According to the study, the price for such drugs is closely related to the economy of the country meaning less economically developed countries proved to have lower prices whilst more economically developed countries had higher total costs.

Oman

The study conducted by the National Library of Medicine¹⁷ showed that the highest price for anti-cancer drugs from the same study was in Oman with a mean of \$2355.66. Such results further confirmed the theory regarding anti-cancer drug prices in more economically developed countries seeing as Oman has had a staggering economy the past years, with it being one of the richest countries in respect to their facilities and workforce.

¹⁶ National Library of Medicine. "Pricing Appraisal of Anti-cancer Drugs in the South East Asian, Western Pacific and East Mediterranean Region." *PubMed*, 28 Dec. 2017, www.pubmed.ncbi.nlm.nih.gov/29282008/

¹⁷ National Library of Medicine. "Pricing Appraisal of Anti-cancer Drugs in the South East Asian, Western Pacific and East Mediterranean Region." *PubMed*, 28 Dec. 2017, www.pubmed.ncbi.nlm.nih.gov/29282008/

United States of America (USA)

The United States of America (USA) is one of the leading countries in industrialization and modernization research, leading the way into new treatments revolving around diseases or health issues. Despite this, the pricing for any medically related treatment in the US is highly priced due to the country's capitalist economic system. For this reason, cancer treatment is very costly. The fact that health care is not public in the US has been an issue concerning many generations now and has been even more heightened with the pricing appraisal of anti-cancer drugs. People are often unable to be granted the needed treatment due to their lack of financial means and are left with extremely limited resources to tackle the disease.

Union for International Cancer Control (UICC)

The Union for International Cancer Control (UICC) was first formed by a group of researchers in 1933 as a way of creating a unity aimed at reducing the cancer burden placed on individuals. Its main actions consist of a specific advocacy that speaks upon cancer issues, informing people on recent topics, holding several campaigns on cancer treatment, and hosting global events. One of the main practices that they vouch for is the organization called World Cancer Day Organization. The World Cancer Day organization was formed on February 4th, 2000 to spread awareness on the issue of cancer, unite the cancer community, reduce the cancer burden to the community, and promote cancer control in the health institutes. Furthermore, they promote the idea that access to anti-cancer treatments and drugs should be available to all, supporting the notion that the government should intervene and impose legislation and investments to organizations conducting research and development for such drugs.

European Cancer Organization

The European Cancer Organization is a non-profit organization created in 1981 by a group of scientists with the aim of reducing the cancer burden on individuals suffering from this life-threatening disease. They aim at aiding in the detection of the disease in its early stage so as to tackle it easier, improving the quality of health care surrounding the subject, and wishing to improve the outcomes of the cancer treatments. Their most recent action is called "The European Code of Cancer Practice: Championing the Rights of Cancer Patients Across Europe". It is an incentive for empowering cancer patients by providing them with a certain code for rights on the health care sector, signing on the expectations that patients should have when receiving the necessary treatment for cancer.

BLOCS EXPECTED

Bloc 1/ Countries affected by the pricing appraisal

This bloc should consist of countries that are highly affected by the pricing appraisal. Such countries include those in East Asia (e.g. China, Japan, Taiwan, etc.) and countries around the Mediterranean region (e.g. Syria, Italy, Morocco, Israel, Cyprus, etc.). The aim of such countries is to tackle the issue that affects their economy and society of their nation as a whole.

Bloc 2/ Countries not affected by the pricing appraisal

This bloc should include countries that are not affected by the pricing appraisal to a harmful extent. Such countries include specific ones in Europe, such as Germany, the United Kingdom, Greece, Norway, Denmark, etc. as well as those in America, including the United States of America. The stance that these countries have is to limit such appraisals in price since it may affect their nations in the future.

TIMELINE OF EVENTS

Date	Description of event
1919	First use of chemotherapy on a patient
1933	The Union for International Cancer Control is formed
1956	The first cancer patient cured successfully
May 10th 1965	International Agency for Research and Cancer is founded
late 1960s	Modern version of chemotherapy is discovered
February 4th 2000	World Cancer Day Organization is founded
22nd-28th October 2022	The World Cancer Congress takes place

RELEVANT UN RESOLUTIONS, TREATIES AND EVENTS

International Agency for Research for Cancer

The International Agency for Research for Cancer is an agency founded on May 10th, 1965 by the World Health Organization which specializes in cancer prevention. The aim of this agency is to promote collaboration between nations to extend cancer research. It also spreads awareness through several seminars and webinars. Furthermore, they aim to disseminate the data collected from the research done with people through their website, educating them on the progress

that has been achieved as well as informing them about a potential new cure for cancer. What they do is of utmost importance, seeing as they are educating people on new and effective ways to tackle cancer, potentially lowering the cost of the treatments themselves. It creates a gateway for cancer research to all individuals wishing to obtain knowledge on the topic and as of right now has shown great results, informing everyone on recent developments of cancer drugs.

PREVIOUS ATTEMPTS TO SOLVE THE ISSUE

World Cancer Congress

The World Cancer Congress took place on the 22nd to 28th of October of 2022 in Geneva, Switzerland, a follow up congress to one that was most successful four years back in Kuala Lumpur. The congress was held by the Union of International Cancer Control (UICC) and connected all sorts of health organizations including the World Health Organization, UICC, and more, bringing together some of the most influential stakeholders in the health industry. The aim of the congress was to deliver great development in cancer research to promote long lasting results as well as suggest new tools and materials to help accelerate progress. Although there has not been enough time to evaluate the congresses success or failure, so far it has had positive feedback on the decisions taken.

POSSIBLE SOLUTIONS

Imposing related laws

A way of limiting the pricing appraisal of such anti-cancer drugs is by suggesting the implementation of laws that set a price maximum for such drugs. Such laws would be imposed by all member countries and would have specific details for each nation based on its national economy as for there to be a way to solve the issue of less economically developed countries, and not only, being unable to have the necessary medicine available. By setting a price maximum, or price ceiling, the government will be able to prevent firms and health institutes from selling anti-cancer treatments and drugs at unprecedented prices. This pricing mechanism may be altered depending on the country's annual income and the average wage of its civilians so as to work accordingly to each country's specific needs. Despite the control implemented over the pricing of such drugs some firms may be discouraged to provide their products for a lower price, urging the black market to develop. As a way of addressing this, governments could potentially have inspecting agencies looking over the market for such parallel markets being

developed and interfere by any means available, if needed, to ensure credibility and transparency in the anti-cancer drug industry.

Provide financial aid to patients originating from low-income households

Another way of dealing with the high prices of anti-cancer drugs is by providing financial aid to patients originating from low-income households. That could be achieved by creating an organization which would raise funds and support such households. The initial funding could be achieved by the World Bank and the UN. Furthermore, funds can also be raised through private investors and/or any other willing individuals wishing to contribute to the cause. In order to ensure the transparency of such actions and that they are directed to the households, each household will be expected to report to the nation's government with their financial positions and the government, along with the UN, will be granting aid to ones that are of a specific scale of income, determined by the World Health Organization. The decision on which households will be granted will happen by looking through the bank statements of the families and evaluating their need for such aid.

Creating a specialized organization

The organization mentioned previously will be one that will raise funds so as to support households that are not as financially stable. The organization will be seen as a block of the World Health Organization and will be funded by the UN and the World Bank. Each country will be expected to have the organization get involved with the financial aspect of cancer treatment, ensuring that the right funding is given to families in need of such. Its aim will be guaranteeing that all patients in need of the right financial aid to cure cancer are able to do so without greatly minimizing their overall income. It will be able to help households in need of the right finances in an extremely difficult and mentally draining situation.

Providing subsidies to firms conducting research for anti-cancer drugs

As a way of encouraging the research for more affordable types of anti-cancer drugs the governments of all member nations may be asked to provide the necessary subsidies to firms conducting such research. Subsidies are a form of government intervention in the market for anti-cancer drugs to provide a sum of money to firms as a way of increasing production. Specifically for firms conducting cancer research, the government could help provide them with the specific materials needed. With such subsidies, firms will be encouraged to develop new cancer treatments and will be able to sell such for a lower price. By lowering prices, the amount of people able to purchase the necessary treatment for the disease will increase.

Raise Awareness

One last way of limiting such prices is through raising awareness on the issue. Awareness will be raised through campaigns that can be based on social media in order to reach a wider audience due to the great demographic that is being covered with lower amounts of money spent. Such campaigns would be funded by the World Bank and would aim at reaching individuals willing to aid the cause through funding. It would be based on running campaigns encouraging the funding of organizations, such as the one suggested above.

BIBLIOGRAPHY

National Library of Medicine. "Pricing Appraisal of Anti-cancer Drugs in the South East Asian, Western Pacific and East Mediterranean Region." *PubMed*, 28 Dec. 2017, www.ncbi.nlm.nih.gov/29282008/

"Availability, Affordability, Access, and Pricing of Anti-cancer Medicines in Low- and Middle-Income Countries: A Systematic Review of Literature." *Frontiers*, www.frontiersin.org/articles/10.3389/fpubh

Vinay Prasad, Kevin De Jesús & Sham Mailankody. *Nature Reviews Clinical Oncology*, 14 Mar. 2017, www.nature.com/articles/nrclinonc.2017.31

National Library of Medicine. "Anticancer Drug Prices and Clinical Outcomes: a Cross-sectional Study in Italy." *PubMed*, 10 Dec. 2019, www.ncbi.nlm.nih.gov/31826897/

Phyllis Ocran Mattila, Rabbiya Ahmad, Syed Shahzad Hasan and Zaheer-Ud-Din Babar. "Availability, Affordability, Access, and Pricing of Anti-cancer Medicines in Low- and Middle-Income Countries: A Systematic Review of Literature." *Frontiers*, 30 Apr. 2021, www.frontiersin.org/articles/10.3389/fpubh.2021.628744/full

"Cancer Treatment in Singapore: Cost, Subsidies & More | DBS Singapore." *DBS*, 13 Sept. 2022, www.dbs.com.sg/personal/articles/nav/protection/cancer-treatment-costs-guide

Vinay Prasad, Kevin De Jesús, Sham Mailankody. "The High Price of Anticancer Drugs: Origins, Implications, Barriers, Solutions." *PubMed*, 14 Mar. 2017, www.ncbi.nlm.nih.gov/28290490/

Irvin S. Snyder. "What Is Cancer?" *National Cancer Institute*, 5 May 2021, www.cancer.gov/about-cancer/understanding/what-is-cancer

"Prescription Drug." *Cambridge Dictionary | English Dictionary, Translations & Thesaurus*, www.dictionary.cambridge.org/dictionary/english/prescription-drug

"What Is Cancer?" *National Cancer Institute*, 5 May 2021, www.cancer.gov/about-cancer/understanding/what-is-cancer

"Appraised Price Definition." *Law Insider*, www.lawinsider.com/dictionary/appraised-price

"History of Chemotherapy." *News-Medical.net*, 26 Feb. 2019, www.news-medical.net/health/History-of-Chemotherapy.aspx

"History of Cancer Treatments: Chemotherapy." *American Cancer Society | Information and Resources About for Cancer: Breast, Colon, Lung, Prostate, Skin*, www.cancer.org/treatment/understanding-your-diagnosis/history-of-cancer/cancer-treatment-chemo.html

Lang, Hui-Chu, and Shi-Liang Wu. "Lifetime costs of the top five cancers in Taiwan." *The European Journal of Health Economics*, vol. 13, no. 3, 2011, pp. 347-353

"Appraised Price Definition." *Law Insider*, www.lawinsider.com/dictionary/appraised-price

"What Is Cancer?" *National Cancer Institute*, 5 May 2021, www.cancer.gov/about-cancer/understanding/what-is-cancer

"Prescription Drug." *Cambridge Dictionary | English Dictionary, Translations & Thesaurus*, www.dictionary.cambridge.org/dictionary/english/prescription-drug

"Least Developed Countries (LDCs) | Department of Economic and Social Affairs." *Welcome to the United Nations*, www.un.org/development/desa/dpad/least-developed-country-category.html

"More Economically Developed Countries." *Britannica Kids*, www.kids.britannica.com/kids/article/more-economically-developed-countries/476297

"Treatment." *Cambridge Dictionary | English Dictionary, Translations & Thesaurus*, www.dictionary.cambridge.org/dictionary/english/treatment

"Chemotherapy." *Nhs.uk*, 20 Oct. 2017, www.nhs.uk/conditions/chemotherapy/

"History of Cancer Treatments: Chemotherapy." *American Cancer Society | Information and Resources About for Cancer: Breast, Colon, Lung, Prostate, Skin*, www.cancer.org/treatment/understanding-your-diagnosis/history-of-cancer/cancer-treatment-chemo.html

IARC: Home, www.iarc.who.int/

"About IARC – IARC." IARC, www.iarc.who.int/cards_page/about-iarc/

"News and Events." *Cancer Prevention – Cancer Research for Cancer Prevention*, www.cancerpreventioneuropa.iarc.fr/news-and-events/

"Our Story | World Cancer Day." *Official Website of World Cancer Day by UICC | 4 February*, www.worldcancerday.org/our-story

"Leukemia." *WebMD*, 13 Sept. 2016, www.webmd.com/cancer/lymphoma/understanding-leukemia-basics

"Chemotherapy." *Nhs.uk*, 20 Oct. 2017, www.nhs.uk/conditions/chemotherapy/

"More Economically Developed Countries." *Britannica Kids*, www.kids.britannica.com/kids/article/more-economically-developed-countries/476297

"NCI Dictionary of Cancer Terms." *National Cancer Institute*, www.cancer.gov/publications/dictionaries/cancer-terms/def/tumor

"Medical Definition of Topoisomerase." *RxList*, www.rxlist.com/topoisomerase/definition.htm

UICC | *Leading the Global Fight Against Cancer*, www.uicc.org/

"History of UICC." *UICC | Leading the Global Fight Against Cancer*, www.uicc.org/who-we-are/about-uicc/history-uicc

Super User. "Mission and Vision." *European Cancer Organisation*, 28 Mar. 2020, www.europeancancer.org/resource/mission-and-vision

Home - *European Cancer Organisation*, www.europeancancer.org/

"Side Effects of Chemotherapy." *Teenage Cancer Trust*, www.teenagecancertrust.org/information-about-cancer/side-effects-of-chemotherapy