Cancer Disparities

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Cancer disparities are defined by the National Cancer Institute as “adverse differences in cancer incidence (new cases), cancer prevalence (all existing cases), cancer death (mortality), cancer survivorship, and burden of cancer or related health conditions that exist among specific population groups.” Some cancer disparities are caused by things that people can control, like smoking. Other differences are caused by uncontrollable factors, like race and gender. It is important to understand what types of disparities exist and why they exist so that patients can find their best fit for treatment and more cases of cancer can be prevented. 1

In this section, we will explore several factors that contribute to cancer disparities:

- Socioeconomic status
- Access to healthcare
- Culture and beliefs
- Global disparities
- Diet and nutrition
- Biology
- Cancer Disparities Resources

Socioeconomic status

Socioeconomic Status (SES) is defined as the social standing or class of an individual or group. It is measured by considering factors like education, income, and occupation. SES is frequently broken up into three categories: low, middle, and high socioeconomic status. People of low SES tend to have few resources while those of high SES have many resources.2

There are many cancer disparities that result from low socioeconomic status or a lack of resources.

Income

Some cancers are more common among people with lower incomes as compared to people with higher incomes. This trend is noticeable in lung and cervical cancers. A study that analyzed records from over 26,000 cancer patients between 1973-2001 found that:

- In both males and females, lung cancer rates were more than 1.7 times higher among those with family incomes less than $12,500 than in those with family incomes of $50,000 or more.
- Women in poverty have higher rates of cervical cancer than those with family incomes above the poverty threshold.3

On the other hand, some cancers are more common among people who earn higher incomes than in people who have lower incomes. This trend is noticeable in prostate cancer and melanoma of the skin. The above study also found that:

- Men with lower incomes are at a reduced risk for prostate cancer relative to those with a family income of $50,000 or more.
- Those with family incomes less than $12,500 had a lower incidence of melanoma than those who have a greater income.3

Over the years, death rates from all types of cancers has increased among the poor. In 1975, the death rate from all cancers combined was 2% higher among men in poorer countries. By 1999, death rates from all cancers combined was 13% higher among men in poorer compared with wealthier countries.4

Education

Those with more years of education are more likely to take preventive measures to benefit their health. Years of education are associated with mammography prevalence, colorectal screening, and cervical cancer screening (Pap tests). Lung, cervical, and colorectal cancer incidence is higher among those with less than a high school education.3

SES and Racial/Ethnic Disparities

Lower socioeconomic status is associated with worse cancer outcomes, regardless of race and ethnicity. For

instance, in a comparison of death rates due to all cancers combined, men with twelve or fewer years of education had death rates almost three times higher than college graduates. This was true whether the poorly educated men were white or black.[5]

Nonetheless, SES is a key contributor to racial/ethnic disparities. As the chart below illustrates, racial/ethnic minorities have lower socioeconomic statuses,[5] leading to higher cancer mortalities. In addition, lower SES contributes to minorities' underrepresentation in scientific research, since a higher income level is associated with greater participation in clinical trials.[6]In fact, in one study SES not only contributed to but determined participation in clinical trials; racial/ethnic disparities in enrollment were eliminated by controlling for socioeconomic status.[7]

Access to healthcare

Access to health care plays a major role in both cancer prevention and treatment. Access to health care is defined as “the timely use of personal health services to achieve the best health outcomes.” This includes access to health insurance, sites where patients can receive needed services, providers that meet patient’s individual needs, and caregivers who they can trust.[8]

The stage at which cancer is diagnosed can be critical to survival and health outcomes. Patients have more treatment options when they are diagnosed early. Once the cancer advances and patients are diagnosed with late-stage cancer, the cancer is more difficult to treat and there are less treatment options.

Breast cancer is one type of cancer for which early detection methods exist. Those who have adequate access to healthcare can undergo mammography screening. Mammography uses X-rays to create images used to locate tumors in the breasts. Disadvantaged populations are more likely to be diagnosed with late-stage breast cancers because they have limited access to these screening services and primary care in general.

Two Atlanta-based studies revealed racial disparities in travel time to cancer treatment centers. One 2008 study showed that African American women were four to five times more likely than white women to have a delay in treatment of 60 days or longer. A 2013 study showed that women who live in predominantly African American neighborhoods had longer travel times to reach radiation facilities than women who lived in predominantly white neighborhoods.

Thus, it is no surprise that African Americans suffer the greatest burden for each of the most common types of cancer. Regarding breast cancer, though white women have higher incidence of breast cancer, African American women are more likely to die from the disease. According to the National Cancer Institute, this could be due to a lack of medical coverage, barriers to early detection and screening, and unequal access to improvements in cancer treatment. [9]

Culture and beliefs

Cross-cultural studies show that different populations have different health outcomes. For example, comparing cancer incidence and death rates in four races (whites, blacks, American Indians/Alaska Natives, and Asians/Pacific Islanders) and Hispanics shows that white women develop cancer more than other groups, but black women die from cancer more than other groups.[10] Racial disparities are documented in many cancer types, like endometrial, liver, bladder, lung, thyroid, kidney, pancreatic, ovarian, and rectal cancers.[11], [12], [13], [14], [15], [16], [17] The following section examines sociocultural contributors to disparities in cervical and breast cancers in the United States.

Note: *Cervical cancer screening involves Pap smears; breast cancer screening involves mammograms. Cervical cancer is preventable via the human papilloma virus (HPV) vaccine.*

Women belonging to ethnic minorities die from breast and cervical cancer more than whites.[18] The American Cancer Society estimates that in 2013, African Americans exhibited the highest breast cancer case-mortality rate of all ethnic groups.[19] They also present with invasive breast cancer at younger ages than other groups, even when all groups have equal access to healthcare.[19] Similarly, a study of black women in Massachusetts found that the death rate due to cervical cancer is two times higher in black women than white women--despite ubiquitous health care access and high rates of screening.[20] Likewise, Latinas are twice as likely to die from cervical cancer as Caucasians,[21] and Asian women screen for cervical cancer less commonly than whites, blacks, and Native Americans/Alaska Natives (NA/AN).[22] Though data on NA/AN are scarce, partly because NA/AN are often classified incorrectly,[5] the existing data show that they develop cervical cancer more than whites.[23]

Differences within subgroups exist as well; among Asian Americans, Korean and Vietnamese women have been documented with higher rates of cervical cancer incidence and death.[24] Chinese and Asian Indian women, in another study, screened for cervical cancer less than other Asian subgroups.[22] Among Hispanic subgroups, uninsured Puerto Rican women had high rates of cervical cancer screening but strikingly low rates of breast cancer screening,[25] and among black women, Jamaicans screened for cervical cancer much more commonly than Haitians.[20]

One of the US Department of Health and Human Service's Healthy People 2020 goals is to do away with these

disparities. Achieving this goal relies on discovering why such disparities exist, and research has uncovered the following sociocultural contributors:

Misinformation
Among various races, there are differences in education and income level, and these lead to differences in knowledge about cancer and its prevention.[26] If culturally and linguistically suitable information about cancer is not available, as is often the case,[20], [24], [27], [18] misbeliefs go unchecked. The table below summarizes common misconceptions about cervical cancer.

Misbeliefs that contribute to lower rates of screening and/or higher rates of cervical cancer

Misbelief	**Truth**
Older women do not need to get Pap smears if they are not sexually active.[20]	After infection with HPV, the virus can lie dormant for years, even if the infection was cleared by the immune system. Anyone who has ever been sexually active is at risk for cancer.
Young, virgin women are not at risk for cervical cancer because they're not sexually active.[24]	Women may classify themselves as virgins who aren't sexually active because they have never engaged in *vaginal* intercourse. However, anal sex can lead to cancer. In fact, oral sex is a major contributor to mouth/throat cancer.
Avoiding sexual relationships before marriage protects against cervical cancer.[24]	Even if an individual has abstained from sexual relationships before marriage, his/her spouse might not have done the same, potentially leading to cervical cancer in the abstinent individual.
Parents who vaccinate their children are giving them permission to have sex.[20], [27] Children should not have sex, so why vaccinate them?[28]	Vaccination with HPV does not increase promiscuity.[29] Vaccinating a child/teenager does not tell him/her to have sex at leisure. Sexual behavior depends on other factors.
Only girls need to get vaccinated for HPV.[27]	Upon infection with HPV, men can transmit the virus, potentially causing cervical cancer in their female partners. HPV can also cause men to develop cancers of the anus, penis, and mouth/throat.
If a virgin girl undergoes a Pap smear or receives the HPV vaccine, she will no longer be a virgin.[20]	Pap smears and vaccinations do not affect virginity. Virginity depends on sexual behavior.
An abnormal Pap smear result is not serious. How often do you hear about people dying from cervical cancer anyway?[20]	The Pap test has a sensitivity of 93%.[30]
Following up on an abnormal Pap smear result can prevent women from having sex or children later.[20]	Following up on an abnormal Pap smear result usually involves diagnostic tests to determine whether cervical cancer is truly present. These do not affect sexuality.
Cancer automatically leads to death (so I don't want to know if I have it).[20]	Especially if treatment begins early, cancerous cells can be killed before they become invasive, allowing a patient to survive.

Unfamiliarity with Preventive Care Practices
Some races/ethnic groups develop cancer more because they undergo screening exams like Pap smears less frequently,[27] leading to diagnoses at more advanced stages[20], [31], [19] and less successful treatment. One reason immigrants have lower rates of cancer screening is that they may come from countries where preventive healthcare is not a norm: people go to their doctor only when they feel pain or experience abnormal symptoms. They see no need to go otherwise, thinking that because they don't see symptoms, they are healthy. [20], [24], [27] As a result, young, single women with no children may not see a need for cancer screening,[24] and they delay visiting an obstetrician/gynecologist until pregnancy.[20]

However, after some time, immigrants become more familiar with preventive care. Alhough minorities, especially those who recently immigrated, underuse breast cancer detection tests,[18] being in the US for ten years or more has been associated with greater mammography use.[22] Accordingly, screening test use varies by length of residence in the US (as well as other factors).[25]

Other Responsibilities
Many black women, as key breadwinners, prioritize familial duties over their own health.[20] Many Afghan immigrants do the same, their collectivist culture emphasizing their roles as caretakers of their families.[18] Similarly, Latina women may delay seeing a doctor until their ability to work is compromised. As one Latina said, "'We will go to a doctor when we can no longer stand the pain, because we need to prepare our soups, or go to work.'"[27]Likewise, for many Vietnamese immigrants, earning money is more important than personal health. In Vietnam, they may have been too poor to miss work as needed to see a doctor, and this "'Money comes first, then health'" mentality comes with them to the US.[24]

Prejudice
Many black women have described unconscious bias and racism on the part of health care providers, which contributed to a sense of distrust of providers and reluctance to pursue further care.[20] Native Americans exhibit the same distrust.[32] According to the American Cancer Society's *Cancer Facts and Figures 2016*, "racial and ethnic minorities tend to receive lower-quality health care than non-Hispanic whites even when insurance status, age, severity of disease, and health status are comparable. Social inequalities, including communication barriers and provider/patient assumptions, can affect interactions between patients and physicians and contribute to miscommunication and/or delivery of substandard care."[5]

Cancer and Sexuality Taboos
Mothers influence their daughters' health-seeking behaviors.[24] Parents who do not speak to their children about sexuality and cancer create taboos around the subjects, making their children less comfortable seeking care in a public healthcare setting. Yet, in some cultures topics like cancer are not discussed openly. Traditional Vietnamese and Korean cultures hold the belief that *words become seeds*, or that "'If you [talk about] it, it will happen to you.'" [24] Similarly, Latinos are unlikely to discuss sexuality; as one Hispanic Latino parent put it, "'I think that for Hispanic people, sex education is taboo.'" Black women also report not having learned about sexual health from their families.[20]

Modesty
Besides hindering open, educational conversations about sex and cancer, culture can also deter women from visiting OB/GYNs. Afghan women may be reluctant to see male doctors; one elderly immigrant said, "'Islam doesn't say we can't go to a man doctor but I am Afghan and my culture says it's not right.'" [18] Some black women have also stated that in their countries of origin, gynecological issues are handled privately at home, not publicly at hospitals or clinics.[20]

Religion
The concept of fatalism discourages an active fight against illness. In the fatalistic view, disease is decreed by God; it is fate, and as such, it is 'meant to be.' Fatalism has been associated extensively with Hispanics as an obstacle to screening and health care seeking. However, some researchers dispute this finding, arguing, for example, that studies supporting it did not control for factors like socieconomic status.[33] In these researchers' study, Hispanic Catholics believe that God plays a role in health yet also believe that they must actively care for their wellbeing.[33] Similarly, in one study, more religious American Muslim women were more likely to delay seeking healthcare,[34] but in another, Islamic beliefs encouraged women to educate themselves and care for their own health as well as their families'.[18]

Issues of Representation
In general, the demographics of research studies do not correspond to the demographics of the United States. Evidence indicates that minorities are underrepresented in medical research.[35] They are less likely to enroll in clinical trials,[6] decreasing the generalizability of information about drugs. However, in one study this enrollment disparity was eliminated by controlling for socioeconomic status.[7]

However, these reports of misrepresentation do not distinguish between phases of clinical trials, perhaps because phasic minority data is limited. [36]In a Phase I trial, participants are administered different doses of a drug to determine whether the drug is safe at those doses. In contrast, Phase III trials test how effective a drug is, and patients who have exhausted all drugs on the market often enroll in these trials, desperate for any drug that may help them. According to one study, minorities are overrepresented in Phase I trials but underrepresented in Phase III trials, suggesting that they are burdened by risk without corresponding benefit.[36]

Global disparities

The incidence of a cancer is the number of new cases of that cancer diagnosed in a specific population in a given time period.(i.e. 102.7 out of 100,000 African American men were diagnosed with lung cancer between 2004 and 2008)

The incidence (or rate) of cancer is increasing throughout the world. The rate of cancer in economically developed countries is increasing because of cancer-causing behaviors. The rate of cancer in economically developing countries is due to both an aging and growing population and a shift toward cancer-promoting lifestyles.

Some of the most frequent cancers are discussed below.

Breast Cancer:

- The most frequently diagnosed cancer and the leading cause of cancer death among women worldwide
- Rates are highest in Western and Northern Europe, Australia, New Zealand, and North America
- Factors that may differ among different parts of the world include: reproductive and hormonal factors, access to early detection services, alcohol consumption
- Postmenopausal hormone therapy has been shown to increase breast cancer In recent years, breast cancer

death is decreasing in North America and many European countries due to early detection and improved treatment.
- To minimize risk breast cancer risk - maintain a healthy body weight, increase physical activity, and reduce alcohol consumption
- Rates are substantially higher in males than females
- Rates are increasing in historically low-risk areas including Spain and countries in Eastern Asia and Eastern Europe due to changes in lifestyle
- The United States is the only country with significantly decreasing rates due to screening processes that result in the removal of precancerous growths.
- Risk factors include- smoking, physical inactivity, being overweight, being obese, consumption of red and processed meat, and excessive alcohol consumption.37

Lung Cancer:

- Lung cancer is among the most commonly diagnosed cancer and leading cause of cancer death in males.
- In males, the highest incidence rates are in Eastern and Southern Europe, North America, Micronesia and Polynesia, and Eastern Asia.
- In females, the highest incidence rates are in North America, Northern Europe, and Australia/New Zealand.
- Lung cancer trends among females typically lag behind those seen in males because large increases in cigarette smoking by females occurred several decades after the increase seen in males.
- Worldwide measures that can be taken to prevent the incidence of lung cancer include raising the prices of cigarettes and tobacco products, banning smoking in public places, restricting the advertising of tobacco products, and treating tobacco dependence.38

Prostate Cancer:

- Rates are highest in Europe and North America, primarily due to prostate-specific antigen (PSA) screening tests that can indicate the presence of small tumors.
- Males of African descent in the Caribbean region have the highest prostate cancer mortality rates in the world, due partially to difference in genetic susceptibility.
- Death rates in many developed countries are decreasing because of improved treatment.
- Risk factors - obesity, old age, African American race, and family history.38

Stomach Cancer:

- Rates are twice as high in males as in females.
- Highest rates are found in Eastern Asia, Eastern Europe, and South America.
- Rates have decreased in most parts of the world, due to increased use of refrigeration, increased access to fresh fruits and vegetables, and decreased reliance on salted, smoked, and preserved foods.
- There is a strong association between H. pylori, a pathogen found in the lining of the stomach, and the development of stomach cancer. Those infected with H. pylori have a 2 to 6 fold increased risk of developing gastric cancers compared to those without the infection, according to the Center for Disease Control.
- Stomach cancer is high in Colombia and China where H. pylori infects over half the population in early childhood.38

Liver Cancer:

- Rates are more than twice as high in males than females.
- Highest rates are found in East and Southeast Asia and in Middle and Western Africa.
- High rates of liver cancer in these areas are largely due to the fact than many people in these regions are infected with the hepatitis B (hep B) virus or the hepatitis C viruses (hep C).
- Rates of liver cancer are increasing in many parts of the world, possibly due to obesity and the rise in the number of hepatitis C infections.38

Cervical Cancer:

- More than 85% of cervical cancer deaths occur in developing countries.
- The high burden of cervical cancer in developing countries is primarily due to a lack of screening (i.e. Pap smears) that can detect pre cancers.
- Vaccines are available to prevent infection with the human papillomavirus (HPV), the primary cause of cervical cancer, but they are not widely used globally.
- In the U.S., only one third of young girls (age 13-17) complete all 3 doses of the HPV vaccine. Despite the low vaccine coverage, there has been a 56% decline in in young girls since the HPV vaccine was introduced.
- The availability of screening services and vaccines worldwide can play a major role in the reduction of cervical cancer.38

Diet and nutrition

Diet and nutrition can impact cancer prevention efforts and cancer recurrence. People eat differently based on socioeconomic status, geographic region, and cultural or religious identifications.

While certain foods may aid in cancer prevention, consuming other foods can contribute to cancer risk. It is very difficult to accurately detail the relationship between diet and cancer because there are so many factors that must be taken into consideration when performing this type of research. Genetics, lifestyle and the environment are only some of the variables that must be considered when studying the diet-cancer relationship.

Many different foods, and specific chemicals found in foods are currently being studied for their ability to reduce or increase the risk of specific cancers. A few of these are described below, and more details may be found in our Cancer Prevention section.

Vegetables

It is a common misconception that consumption is linked to an increased risk of breast cancer. However, studies suggest that chemicals found in soy, called isoflavones, may actually aid in breast cancer prevention. One study shows that there was a risk reduction of about 16% seen in women who ate 10 mg of isoflavones per day. A half cup of raw soy beans (edamame) contains 176 mg of isoflavones and a four ounce serving of tofu contains 38 mg! Consuming soy early in life seems to confer the most protection against breast cancer.[39], [40]

Dairy

It is difficult to test the relationship between dairy consumption and cancer risk because dairy exists in many different forms. There are several different types of milk products, for example, including fat-free, 2% fat, whole milk, cream, etc. Different dairy products contain varying amounts of fat, proteins, and calcium which can affect people and cancer differently. While some studies have linked dairy consumption with increased prostate cancer risk, others have not found a significant association between dairy intake and this cancer. Some studies also suggest that dairy products can be protective against colorectal cancer risk.[41], [42]

Meat

Eating red and processed meat is linked with increases of certain types of cancer. Red meat is defined as “flesh from animals that have a higher proportion of red muscle fibers than white muscle fibers.” Examples include beef, goat, lamb, and pork. Processed meat typically refers to meats that have been preserved by smoking, curing, salting, or adding chemical preservatives such as sodium nitrate. Examples include ham, bacon, pastrami, and salami. Red and processed meat have been associated with increased risk of colorectal cancer, as well as cancers of the esophagus, liver, kidney, and prostate. Eating 50g of processed meat per day, or about two slices of ham, can increase risk of such cancer by 18 percent, according to the World Health Organization. Limiting this kind of meat in your diet is recommended to reduce cancer risk, specifically for colorectal cancer.[43]

Biology

Black women are 40% more likely to die from breast cancer than white women, and controlling for differences in provider care and socioeconomic status does not eliminate this disparity.[44] Nor does screening use; in a study of military beneficiaries, who enjoy equal access to healthcare services, black women engaged in cancer screening exams as often as other racial/ethnic groups, yet still presented with more aggressive breast cancer, and at more advanced stages.[19] These findings suggest that biological differences--that is, genomic variants found in black women--play a key role in breast cancer racial disparities. Accordingly, black women have higher rates of triple negative breast cancers, more genetic mutations in their breast tumor cells, and other versions of genes that make their cancer harder to treat.[44]

Similarly, Ashkenazi Jewish womeh have mutations in the BRCA1 and BRCA2 genes, which drive breast cancer, more frequently than other ethnicities.[5]

Though biology contributes to cancer disparities, its role is minimal compared to factors like access and socioeconomic status.

Cancer Disparity Resources

The U.S. Centers for Disease Control and Prevention hosts the Health Equity in Cancer website.

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