Addressing Disparities in Cancer Care & Incorporating Precision Medicine for Minority Populations

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Which U.S. Population Groups Experience Cancer Health Disparities?

According to the National Cancer Institute, cancer health disparities in the United States are adverse differences in cancer measures such as number of new cases, number of deaths, cancer-related health complications, survivorship and quality of life after cancer treatment, screening rates, and stage at diagnosis that exist among certain population groups including:

- **Individuals belonging to different ancestry, race, or ethnicity**
- **Individuals of low socioeconomic status**
- **Individuals who lack or have limited health insurance coverage**
- **Residents in certain U.S. geographic locations, such as rural areas, or territories, such as Puerto Rico and Guam**
- **Members of the sexual and gender minority communities**
- **Certain immigrants, refugees, or asylum seekers**
- **Individuals with disabilities**
- **Adolescents and young adults**
- **Elderly**

Cause-specific mortality by county, race, and ethnicity in the USA, 2000–19: a systematic analysis of health disparities

GBD US Health Disparities Collaborators*

Summary

Background Large disparities in mortality exist across racial–ethnic groups and by location in the USA, but the extent to which racial–ethnic disparities vary by location, or how these patterns vary by cause of death, is not well understood. We aimed to estimate age-standardised mortality by racial–ethnic group, county, and cause of death and describe the intersection between racial–ethnic and place-based disparities in mortality in the USA, comparing patterns across health conditions.

Methods We applied small-area estimation models to death certificate data from the US National Vital Statistics system and population data from the US National Center for Health Statistics to estimate mortality by age, sex, county, and racial–ethnic group annually from 2000 to 2019 for 19 broad causes of death. Race and ethnicity were categorised as non-Latino and non-Hispanic American Indian or Alaska Native (AIAN), non-Latino and non-Hispanic Asian or Pacific Islander (Asian), non-Latino and non-Hispanic Black (Black), Latino or Hispanic (Latino), and non-Latino and non-Hispanic White (White). We adjusted these mortality rates to correct for misreporting of race and ethnicity on death certificates and generated age-standardised results using direct standardisation to the 2010 US census population.

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See Comment page 1022

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Lancet August 2023

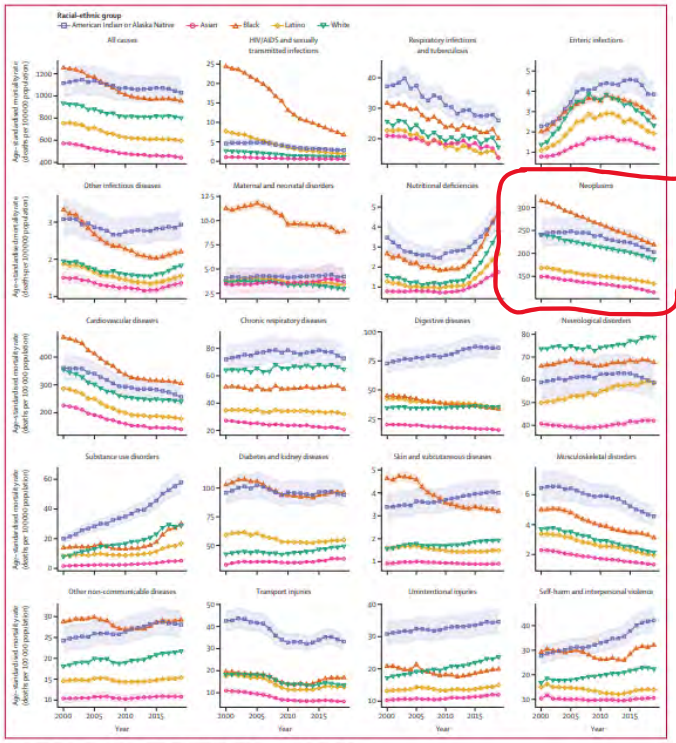


Figure 1: Estimated age-standardised mortality in the USA, 2000–19, by cause, year, and racial-ethnic group
Shaded areas indicate 95% uncertainty intervals.

USA Racial/Ethnic Cancer Care Outcomes Disparities 2023

Black

- ***Prostate cancer*: 2X higher mortality**
- ***Breast cancer*: 40% higher mortality**
- ***Stomach cancer*: 2X higher mortality**
- ***Endometrial cancer*: 2X higher mortality**
- ***Multiple myeloma*: 2X higher mortality**
- *Colorectal cancer*: 31-44% higher mortality

Native American

- *Renal cell cancer*: 64-75% higher mortality than White patients (smoking, **obesity**, DM)
- *Liver cancer*: 2X higher mortality than Whites (hepatitis C, **obesity**, DM, smoking)

Racial/Ethnic Cancer Care Outcomes Disparities 2023

Hispanic

Liver cancer: 2X mortality (hepatitis, aflatoxin, **obesity**)
Stomach cancer: 2X mortality (**obesity**, H. pylori)
Cervical cancer: 20% higher mortality (less screening)

Asian

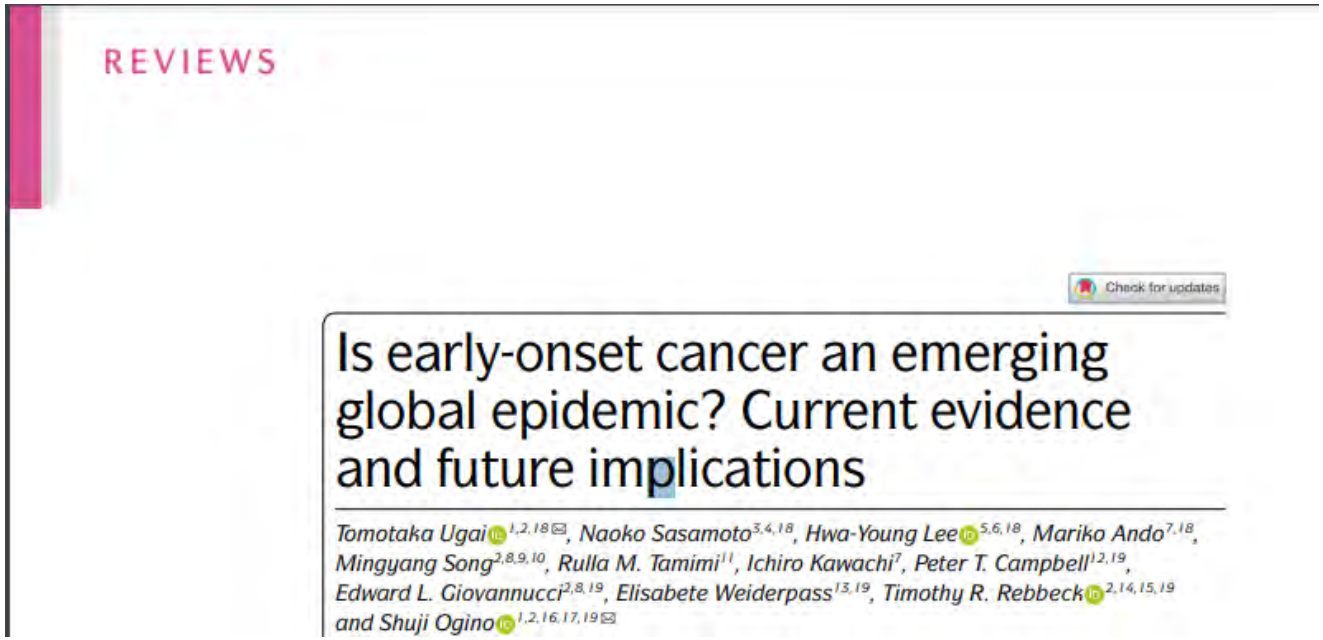
Liver cancer **:** 3X Vietnamese- American c/w Whites

Native Hawaiian- Other Pacific Islanders (NHOPI)

Liver cancer: 3X mortality
Stomach cancer, Breast cancer, prostate cancer, myeloma: higher mortality NH

Early Onset Cancers (Age less than 50)

Ugai T et al: Nature Reviews https://doi.org/10.1038/ s41571-022-00672-8



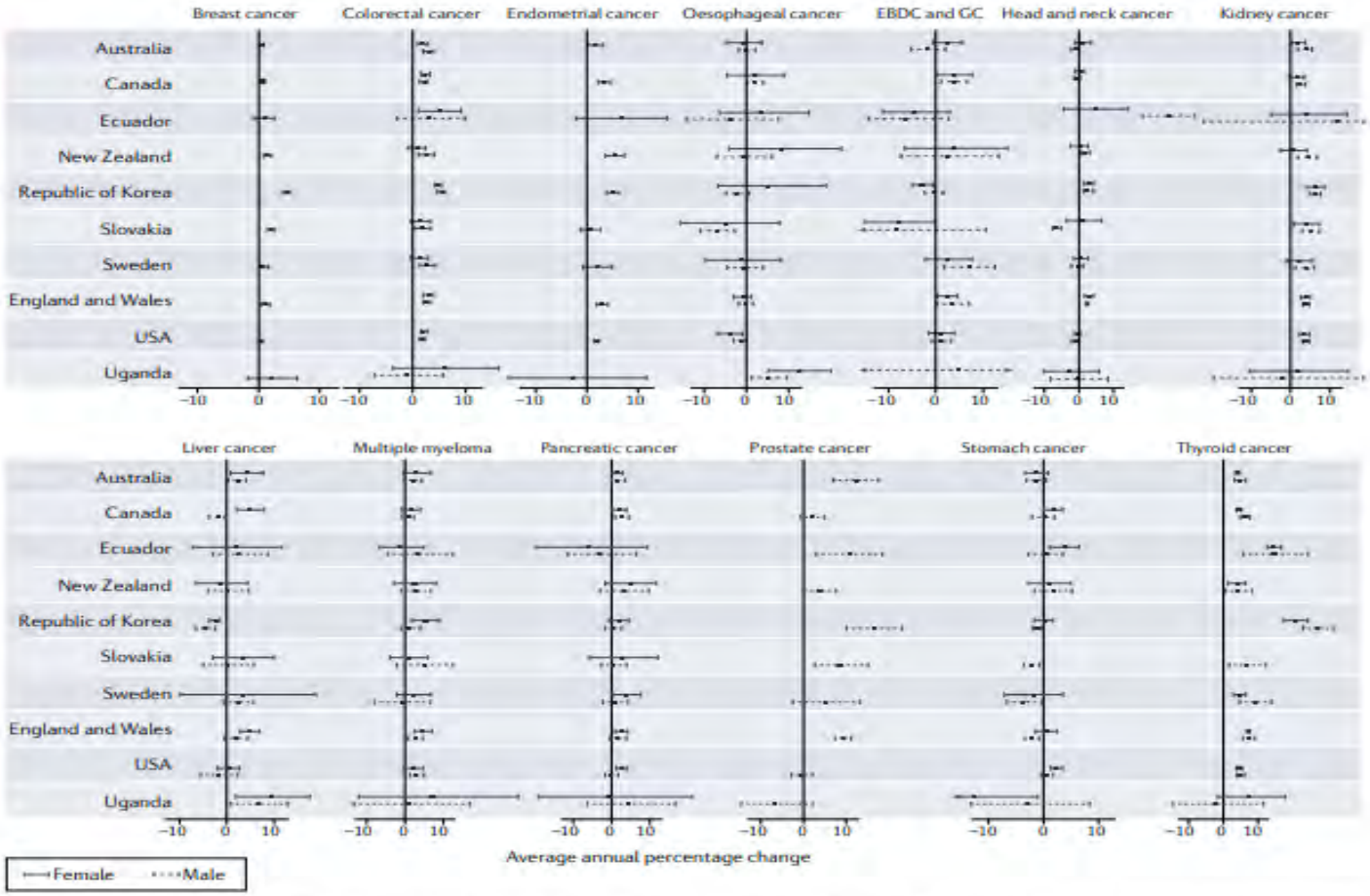


Fig. 1 | **Trends in incidence of selected early-onset cancers.** Trends in the incidence of 14 cancer types with increasing incidences among 20–49-year-old adults between 2002 and 2012 by country and region. Age-standardized cancer incidence data were obtained from the Global Cancer Observatory (GLOBOCAN; https://gco.iarc.fr/). Horizontal bars indicate 95% CIs. Larger 95% CIs that do not fit onto the graph scale are indicated by arrows. Data were obtained from 44 countries that provided age-standardized data on cancer incidence for the period 2002–2012. From among these, we selected ten countries that are indicative of trends in specific geographical regions. The full dataset, including data from all 44 countries, is shown in Supplementary Table 1. Average annual percentage changes with 95% CIs (shown as horizontal bars) in incidence were calculated using the Joinpoint Regression Program (version 4.9.0.1) for data obtained for the period 2002–2012, except for Slovakia (2000–2010) owing to differences in data availability. A maximum of two joinpoints were permitted in this analysis. Although extrahepatic bile duct cancer and gallbladder cancer (EBDC and GC) are distinct cancer types, making precise classifications is often difficult; hence, these cancer types are often recorded and data calculated together. Data were not available on the incidence of thyroid cancer among women in Slovakia.

Potential Factors Associated with Early Cancer (Age <50) Global Epidemic

Change exposome during childhood and early adulthood since 1950s:

Diet (western style: saturated fats, red meat, refined sugar)
Obesity
Exercise
Environmental exposures. Alcohol, antibiotic use

Increased screening for cancer

Thyroid, Breast and Prostate

Ugai et al, Nature Reviews 2022

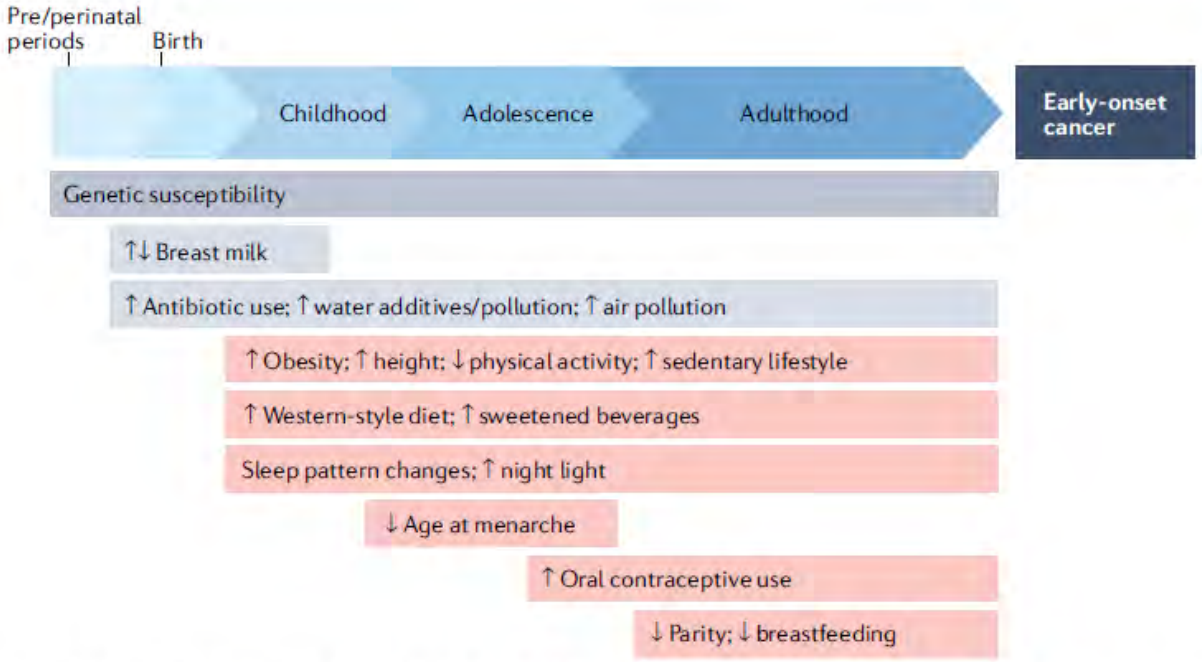
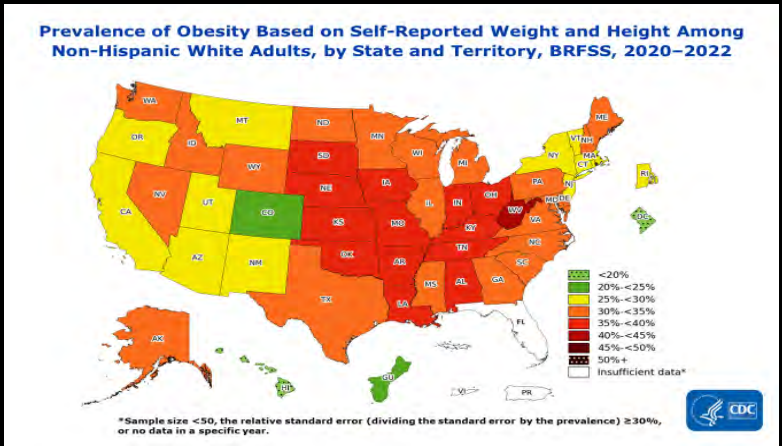
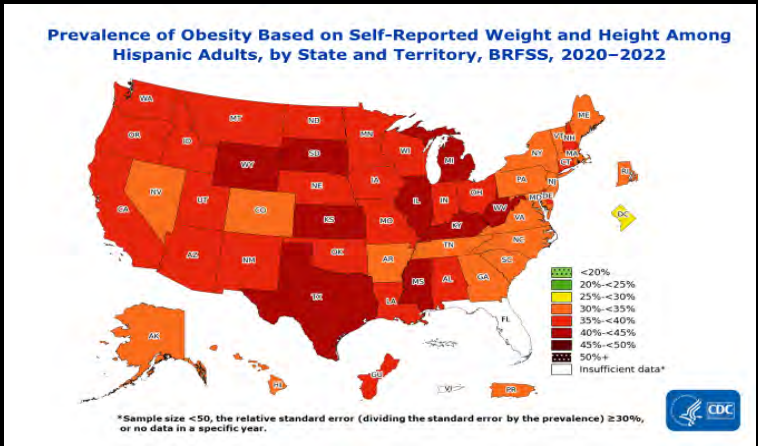
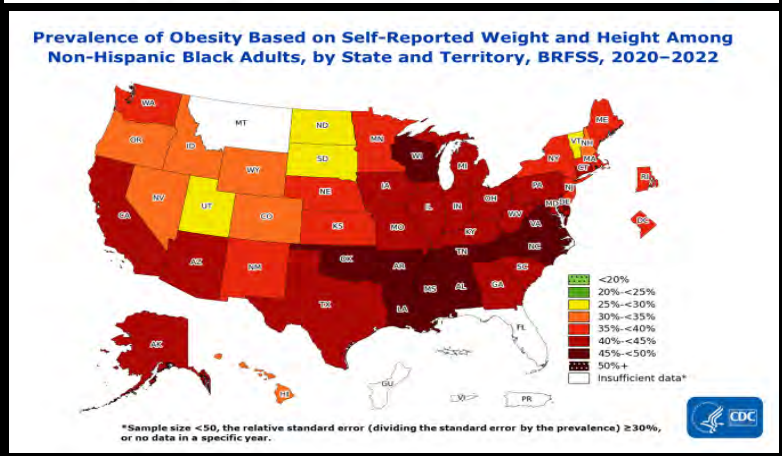


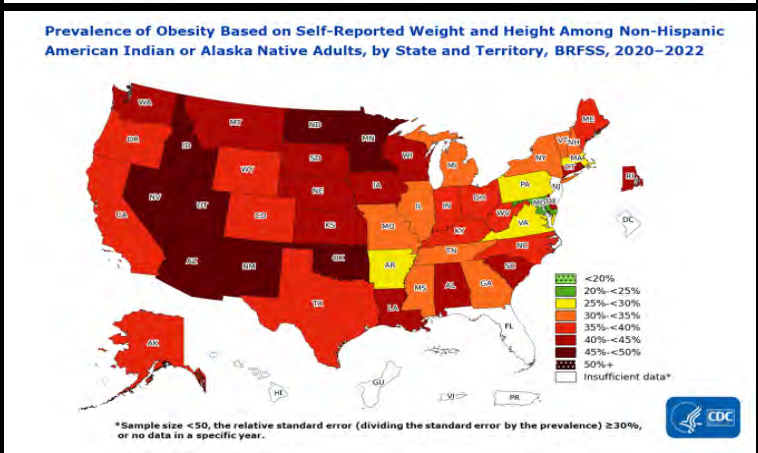
Fig. 2 | **Individual life-course exposures and their relationship with the development of early-onset cancers.** An individual will encounter various exposures throughout life from conception (or even the germ cell period before conception), some of which might also be cancer risk factors. Considering the long latency periods of neoplastic development, risk factor exposures in early life (from conception to adolescence) and during young adulthood are considered to have pathogenic roles in the development of early-onset cancer (defined here as cancer diagnosed in adults ≤50 years of age). Genetic susceptibility results from germline genetic variants with a spectrum from low to high penetrance. Gene–environment interactions can occur at any time throughout the lifetime of an individual. This figure also implies considerable challenges in studying the aetiology of early-onset cancers.

Obesity Prevalence by Race 2022









Journal of Clinical Oncology > List of Issues > Volume 41, Issue 26 >

BIOLOGY OF NEOPLASIA

Clinical Multigene Panel Testing Identifies Racial and Ethnic Differences in Germline Pathogenic Variants Among Patients With Early-Onset Colorectal Cancer

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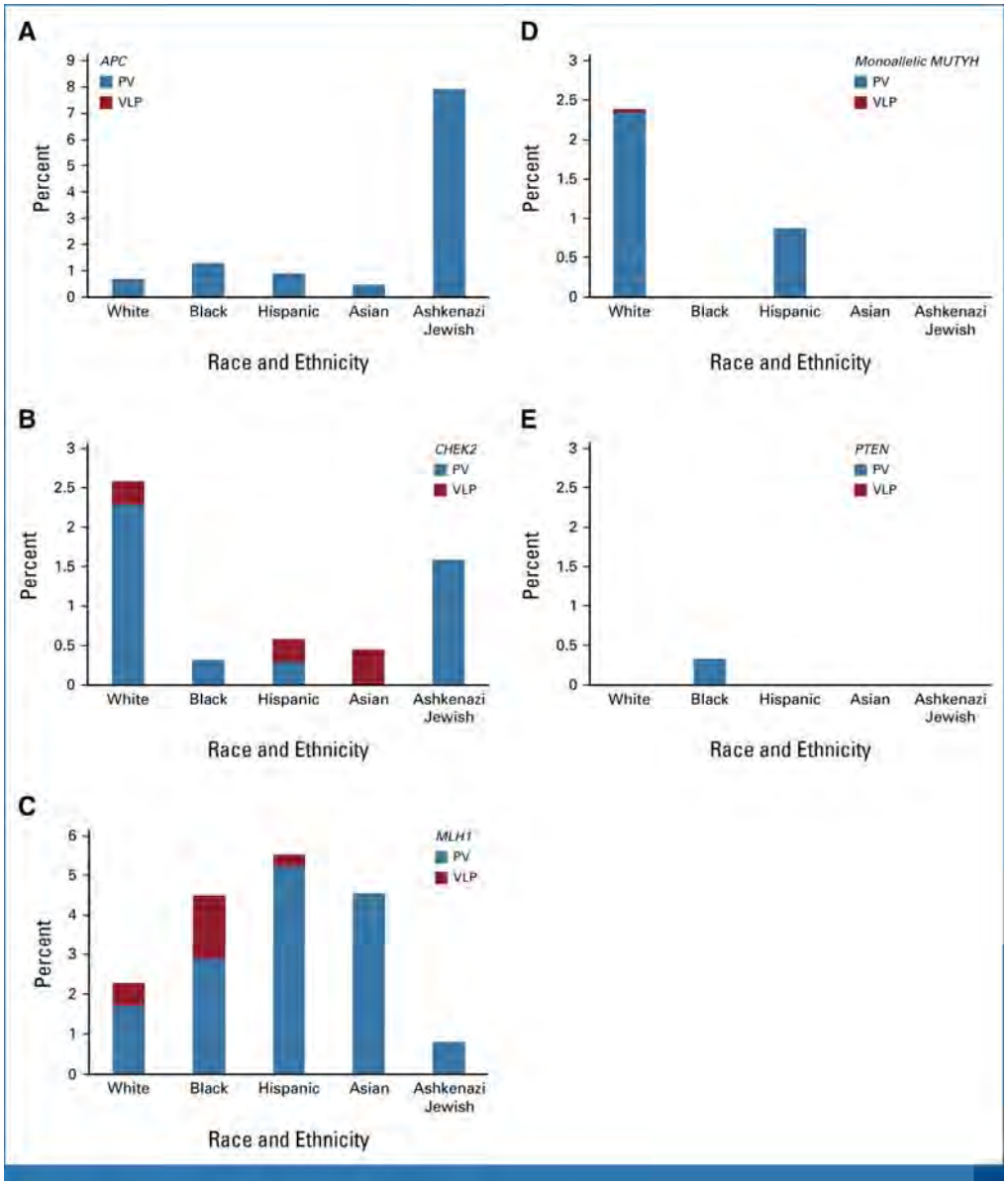
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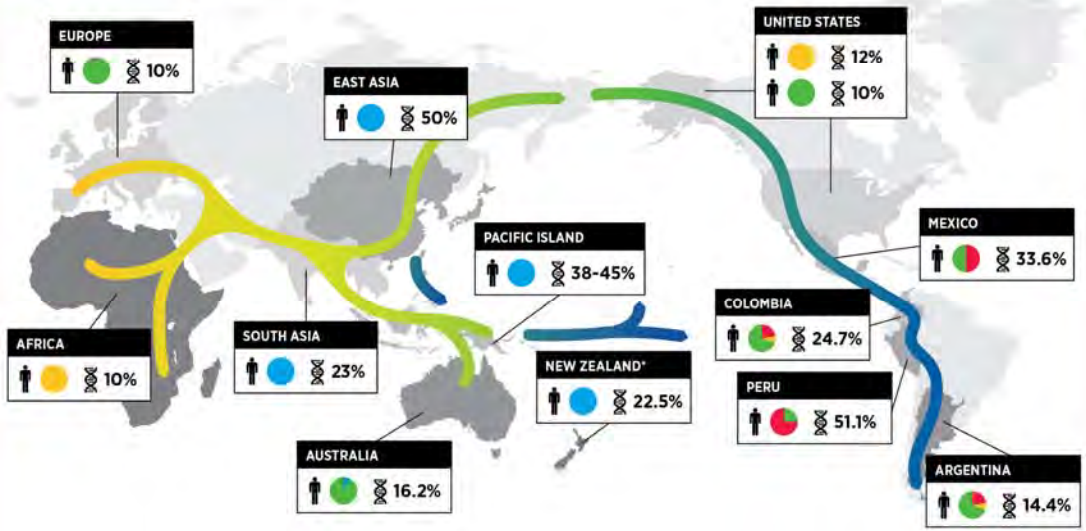
FIGURE 6

Ancestry Contributes to the Prevalence of Cancer-associated Genetic Alterations



*This study exclusively profiled the EGFR mutational frequency in the native Māori population.

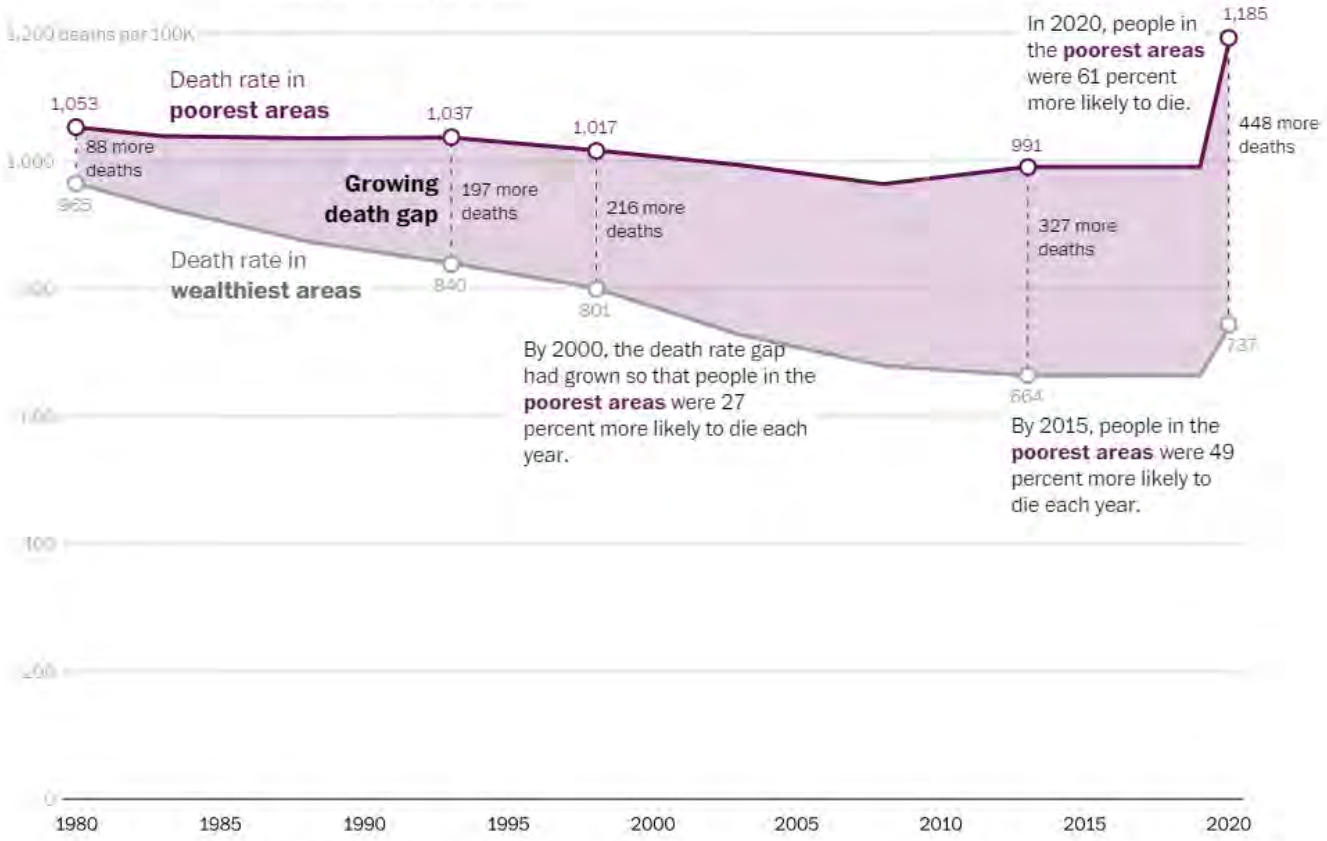
Acquired mutations of the *EGFR* gene are commonly observed in patients with lung cancer and represent a key target for molecularly targeted therapeutics. The frequency of overall somatic mutations in the *EGFR* gene differ based on ancestry of the patient, with the highest mutation rates observed in East Asian groups (50%) and the lowest rates observed in African (10%) and European (10%) populations. The frequency of this mutation follows patterns that are a result of the human diaspora out of Africa as well as more recent migration (forced or otherwise) of population groups to new geographic locations. For example, Peru has a high genetic admixture (i.e., inferring someone's geographical origins based on an analysis of their genetic ancestry) of Native American ancestry while Argentina has more admixture of European ancestry.

American Association for Cancer Research® (AACR) Cancer Disparities Progress Report 2022

SMALL DEATH GAP HAS GROWN WIDE

Death rates of poorest and richest counties

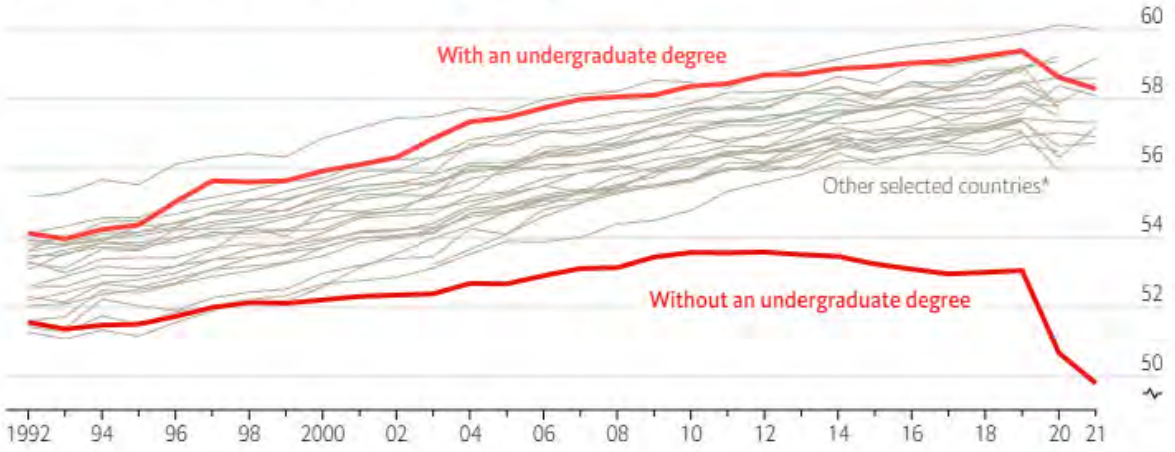
In the early 1980s, people in the poorest areas were 9 percent more likely to die each year, with 88 more deaths per 100,000 people than their wealthy counterparts. That gap has widened significantly over time.



Note: Income differences are adjusted for inflation.
Sources: Centers for Disease Control and Prevention, U.S. Census Bureau

Survival of the richest

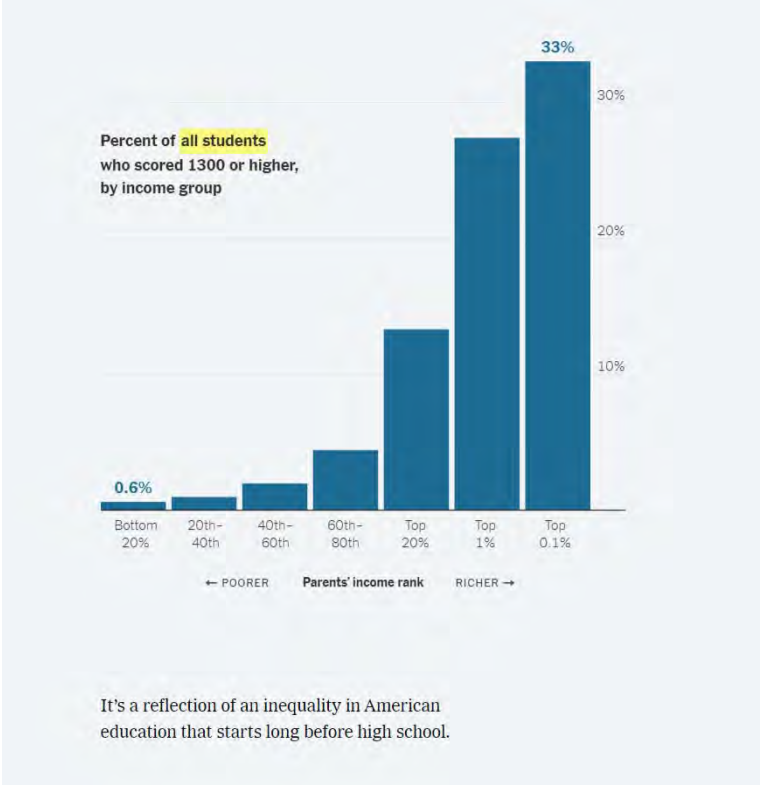
United States, remaining life expectancy at age 25, years



*Australia, Austria, Belgium, Britain, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, South Korea, Spain, Sweden and Switzerland

Sources: Human Mortality Database; "Accounting for the widening mortality gap between American adults with and without a BA", A. Case and A. Deaton, *BPEA*, 2023

NYT 2023



It's a reflection of an inequality in American education that starts long before high school.

Journal of Clinical Oncology > List of Issues > Volume 41, Issue 26 >

ORIGINAL REPORTS | Health Services and Outcomes

Organization of Cancer Specialists in US Physician Practices and Health Systems

Check for updates

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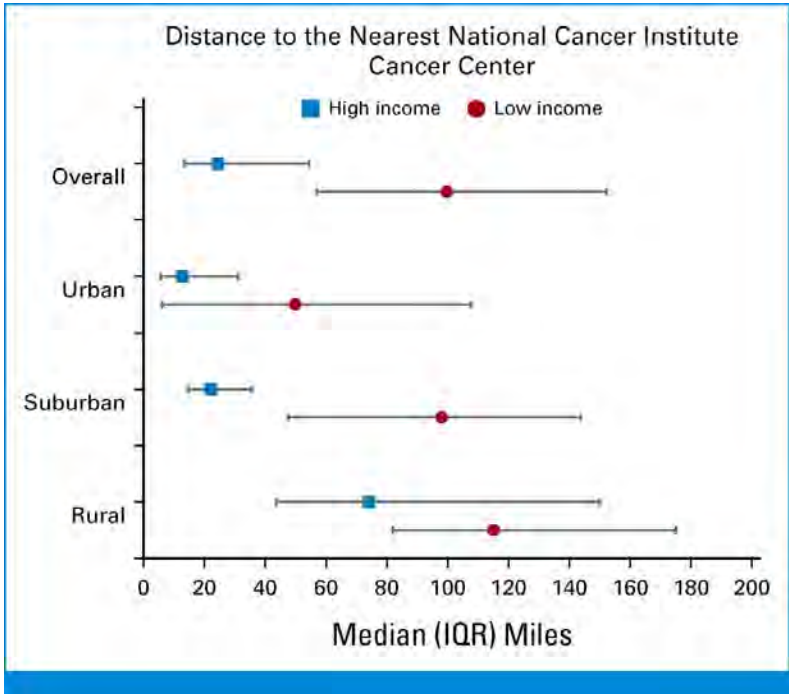

I believe
health care
is a
human right.

—

Join me.

Partners In Health

- “Commercialism in medicine never leads to true satisfaction, and to maintain our self-respect is more precious than gold.” –

William J. Mayo, MD

Thank You for your attention!